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FM 17-27

WAR DEPARTMENT

ARMORED FORCE FIELD MANUAL

81-MM MORTAR SQUAD AND PLATOON

July 30, 1942

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FM 17-27

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81-MM MORTAR SQUAD AND PLATOON

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WAR DEPARTMENT,
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FM 17–27, Armored Force Field Manual, 81-mm Mortar Squad and Platoon, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

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Chief of Staff.

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Major General,
The Adjutant General.

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(For explanation of symbols see FM 21–6.)

TABLE OF CONTENTS

ARMORED FORCE FIELD MANUAL

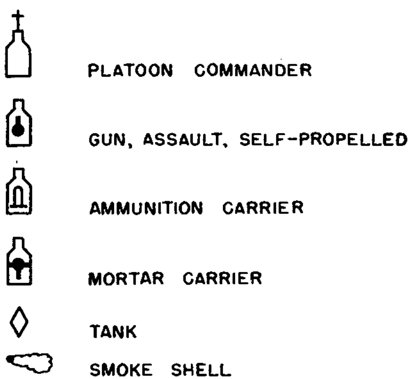
81-MM MORTAR SQUAD AND PLATOON

SECTION I

GENERAL

■ 1. SCOPE.—*a.* This manual covers the tactical employment of the mortar platoon and squad in support of tank and infantry units. It is a guide only. Each situation presents a different problem and is solved by applying the fundamentals set forth herein.

b. Key to illustrations:



■ 2. ORGANIZATION.—*a.* The mortar platoon of the armored battalion, the separate tank battalion, and the armored infantry battalion consists of a platoon headquarters and three squads, each squad being equipped with one 81-mm mortar mounted in a half-track M4. The platoon headquarters is mounted in a half-track M2.

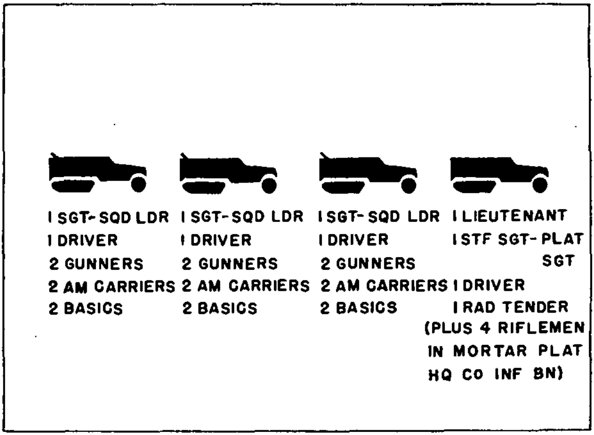


FIGURE 1.—Mortar platoon.

b. The mortar squad consists of 6 men:

1 sergeant, squad leader.
2 gunners, mortar.
2 ammunition carriers.
1 driver, half-track.

■ 3. CHARACTERISTICS.—*a*. The mortar is a smooth bore, high angle fire weapon capable of reaching targets defiladed to flat trajectory weapons. (See FM 23-90 and 23-91.) It can be fired at the rate of 30 to 35 rounds per minute, the normal rate of fire being 18 rounds per minute.

b. The mortar, being mounted in a half-track vehicle, has excellent cross-country mobility and under most conditions of terrain can follow tanks and other vehicles without loss of distance. It may be moved rapidly into position and fired either from the vehicle or the ground. It will usually be fired from the carrier.

c. A caliber .30 and a caliber .50 machine gun on the mortar carrier furnish local protection. All members of the crew are taught to use these guns. When the mortar is fired from the carrier, the basic privates or ammunition carriers man these guns. When the mortar is fired from the ground position, the basic privates man the machine guns.

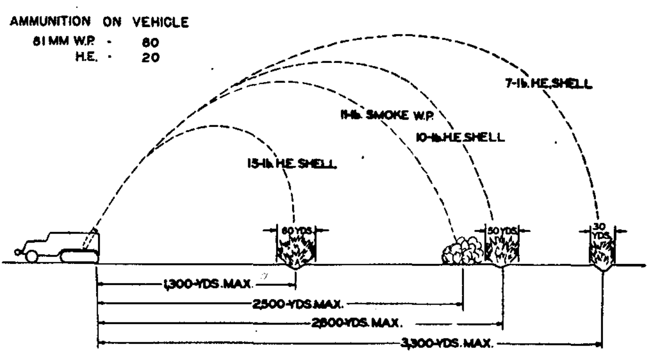


FIGURE 2.—Characteristics of mortar fire.

d. The mortar is provided with two types of ammunition, high explosive and smoke. It may be provided with chemical ammunition for certain operations. In the armored battalion the majority of the ammunition is smoke, while the infantry platoon has more high explosive shell than smoke. Figure 2 shows the characteristics of this ammunition.

■ 4. TACTICAL EMPLOYMENT.—*a.* The mortar is a support weapon. The mortar platoon may be used either as a unit to support the action of the battalion or its squads may be attached to companies or platoons.

b. The platoon or squad is used—

(1) To support the battalion or its components by fire on hostile machine guns, antitank guns, mortars, and personnel.

(2) To fire on targets defiladed from other weapons.

(3) For fire on areas where hostile installations have not been definitely located.

(4) To destroy barricades.

(5) To screen movements of friendly troops.

(6) To blind hostile observation points.

(7) To neutralize the action of hostile antitank guns and automatic weapons.

(8) As a feint to confuse the enemy as to the direction and location of an attack.

(9) To disrupt an attack either of tanks or infantry by use of smoke.

Section II

TRAINING

■ 5. General Procedure.—*a.* Tactical training exercises for the mortar platoon must be progressive and proceed logically from squad to platoon exercises. Later exercises are held in cooperation with other troops.

b. Basic training of the soldier, and the technical training necessary to insure that the mortar squad is proficient in driving, gunnery, communications, marksmanship, drill, and allied subjects, should have been completed before proceeding to tactical training.

c. Tactical training includes—

(1) Marches.

(2) Firing positions.

(3) Security.

(4) Offensive action.

(5) Defensive action.

(6) Retrograde movements.

(7) Special operations.

d. The platoon leader under the direction of the company commander is responsible for training of the platoon. He plans his training to progress from squad to platoon exercises and finally to exercises in support of other units. When the technique of employment of the platoon has been thoroughly covered, the squad and platoon should be attached to other units to participate in combined training, as only by this method can thorough teamwork in combat be obtained.

e. For exercises in cooperation with other units the mortar platoon leader and his noncommissioned officers should be present during the preparatory stages of the problem, that is, during the war game and sand table instruction. (See FM 17–32, 17–33, 17–40, and 17–42.)

■ 6. Training Procedure.—*a.* The platoon leader must plan problems to instruct the platoon in each of the subjects in paragraph 5. He selects the subject, makes a map reconnaissance to determine the ground suitable for the instruction desired, together with his noncommissioned officer, reconnoiters the ground, and then draws up the problem. (See TF 7–265 and 7–266.)

b. The next step is to play the problem on a large scale map. The noncommissioned officers are present. The problem is smoothed out.

c. Next the problem is played on a sand table. The entire platoon should be present. Each man should be given a chance to give a solution to certain phases of the problem. Interest is maintained by injecting unexpected situations and calling upon individuals for their actions and orders.

■ 7. TERRAIN.—*a*. *General*.—Throughout all phases of training, emphasis must be placed upon the study of terrain. This study considers passability, cover and concealment for routes of approach, firing positions, and the effect upon the maneuver of other troops. All crew members must be taught to take full advantage of terrain features. The questions in *b* below will serve to train personnel in making estimates of terrain.

b. *Passability*.—(1) What is the nature of the soil? Is it hard or soft? Will the vehicle sink in a short distance and then be able to move forward, or is there a crust which may carry the vehicle for a time and then break, bogging the machine?

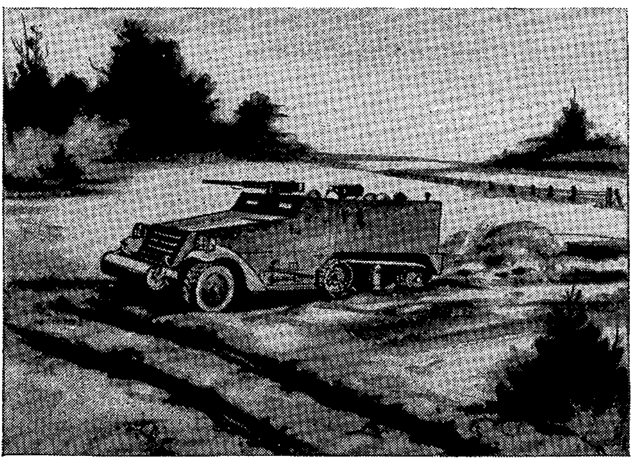


FIGURE 3.—Ground soft. Vehicle sinks in a short distance, is able to proceed in low gear.

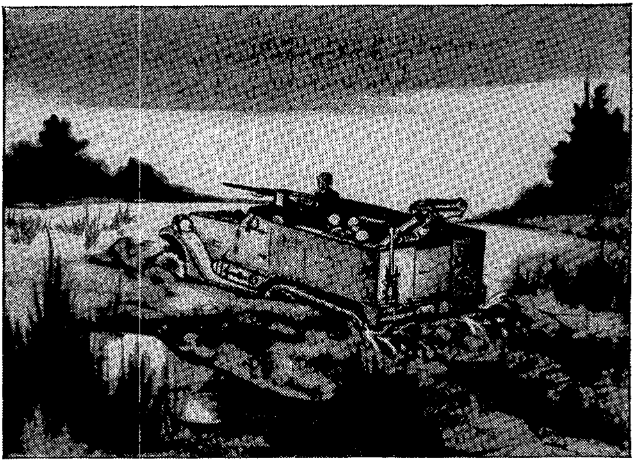


FIGURE 4.—Ground covered with crust. Vehicle breaks through and bogs.

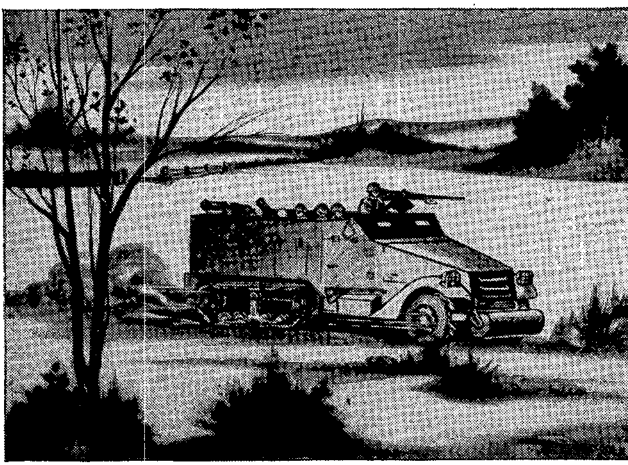


FIGURE 5.—Ground hard. Good traveling.

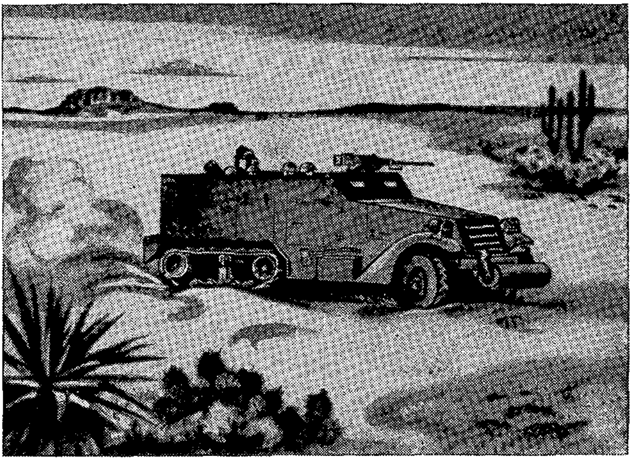


FIGURE 6.—Soil sandy. Passable but increases fuel consumption.

(2) Is ground level or rolling? Is the surface eroded, forming natural barriers around which a route must be reconnoitered?

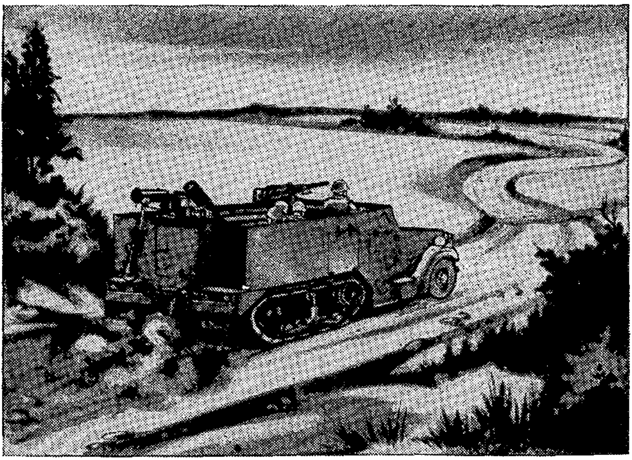


FIGURE 7.—Terrain level and open. Easy traveling but no concealment.

(3) How are stream banks? Soft and swampy, or firm? Steep or sloping? Are stream bottoms soft mud or hard sand or gravel? Is bottom covered with large boulders which will interfere with crossing? Is pioneer work needed or can suitable crossing be found?

(4) What is the type of vegetation? Does it provide concealment from air and ground observation? Is it heavily forested, making traveling difficult? Is it covered with large stumps or boulders?

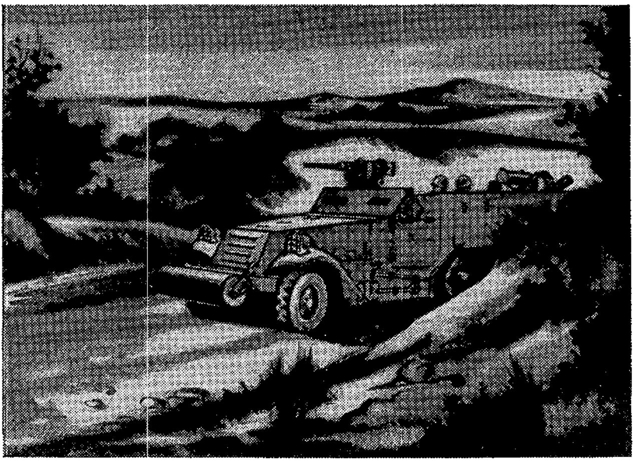


FIGURE 8.—Terrain rolling. Offers good cover and excellent firing positions. If the soil is hard, watch for eroded areas.

■ 8. USE OF HE SHELL.—*a*. High explosive shell is used for the destruction of enemy antitank guns, automatic weapons, mortars, and personnel. To a limited extent it may be used for the destruction of barricades.

b. High explosive may be used to search out areas where targets are known to be located but the exact location of which has not been determined. It is particularly valuable to search such areas to silence antitank guns and machine guns when smoke cannot be used for such purposes either

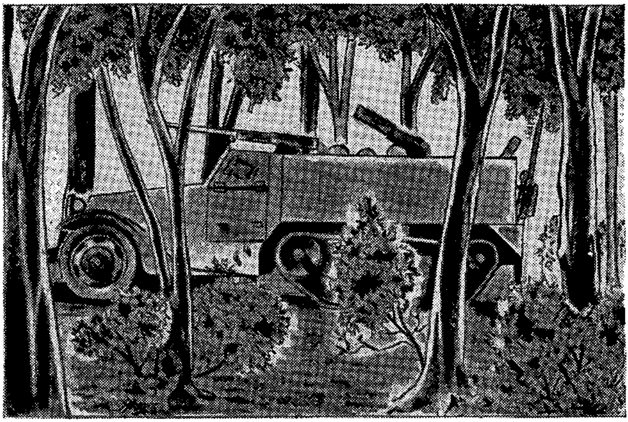


FIGURE 9.—Forested. Requires careful reconnaissance to traverse. Offers good concealment but poor firing positions. Field of fire very limited.

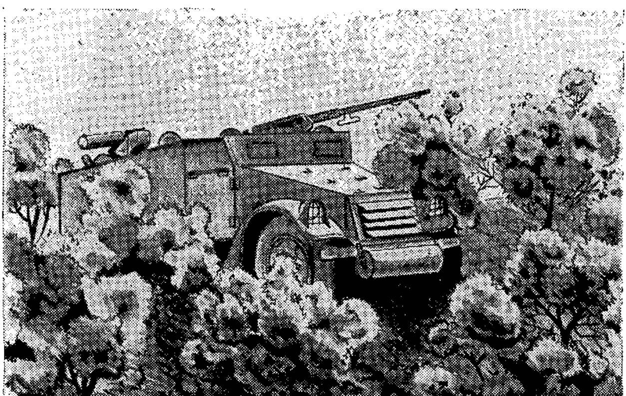


FIGURE 10.—Light brush. Easy to traverse, good firing positions, good concealment from ground observation, but poor concealment from air.

because of adverse wind conditions or because of maneuver requirements. FM 23–90 gives methods for searching an area.

c. Two types of shell are available, heavy and light. The range of the light shell permits reaching targets at a great distance to the front. The heavy shell, although having less than half the range of the light shell, has a much greater demolition effect. For range and characteristics of shell, see figure 2.

■ 9. USE OF SMOKE.—*a*. TM 3–305 covers in general the use of smoke in training. Training in the employment and control of smoke must be thorough. Smoke is subject to the whims of the sun, rain, wind, and terrain. Imprudently used it may cause interference with the maneuver of supported or adjacent units. Properly employed it becomes a powerful means of limiting hostile combat power.

b. Smoke may be employed to—

(1) Screen movement of friendly troops.

(2) Blind hostile antitank guns, automatic weapons, riflemen, observation posts.

(3) Screen an attack or counterattack.

(4) Blind attacking tanks or tank destroyers beyond the range of our own antitank weapons.

(5) Screen engineers and infantry while they are removing mines or clearing paths through obstacles.

(6) Cover a withdrawal.

(7) Screen ferrying operations of troops and construction of bridges.

(8) Deceive the enemy as to the true point of an attack.

(9) Mark targets for air attack.

(10) Hinder movement of a withdrawing enemy. Care must be taken that the smoke does not interfere with our own aimed fire.

■ 10. CHARACTERISTICS OF SMOKE SHELL.—The 81-mm smoke shell is filled with white phosphorus, which in addition to its smoke-producing characteristics has incendiary and casualty effect. The maximum range of the smoke shell is 2,470 yards; the bursting radius is 10 yards; it will produce smoke for

½ minute after bursting; and under favorable conditions of wind will effectively screen for a distance of 75 yards down wind from the point of burst.

■ 11. **Effect of Weather and Terrain.**—Weather and terrain must always be considered in employment of smoke. (See FM 3–5.)

a. Effect of weather.—The most favorable conditions for employment of smoke are cool, cloudy weather with high humidity, fog, or light mist, and a steady wind of low velocity, 3 to 6 miles per hour. Winds above 10 miles per hour tear smoke clouds apart and rapidly dissipate them. Low velocity winds, below 3 miles per hour, are unpredictable and are likely to shift direction unexpectedly. Sunshine, especially in warm weather, causes air currents to rise and smoke is likely to rise in a vertical column, thus giving little screening effect. The effect of sunshine may be counteracted by a moderately strong wind. Vertical ascending currents will occur over barren ground, sand, and burned-over areas. No ascending currents will occur over damp ground, woods, or even brush and tall green grass or grain. Heavy rains wash the smoke from the air. However, high humidity may increase the smoke effect, as the particles of smoke combine with water vapor.

b. Effect of terrain.—The most favorable terrain for smoke is smooth open country. Hills and patches of woods deflect ground winds and cause eddying similar to the eddying of water in a boulder-strewn stream. Ground winds tend to split around hills and patches of woods. They follow the general direction of deep valleys. In broken or wooded country the wind direction at the gun and at the target may vary widely. In open level country it can be safely assumed that the wind direction at the gun and the target are the same. In open level terrain wind direction should be considered for the initial round. In broken or wooded country, except when there is a strong wind, the initial round should be fired in front of the target and later rounds fired according to sensing of the first shot.



FIGURE 11.—Smoke placed in a high wind will blow away rapidly.

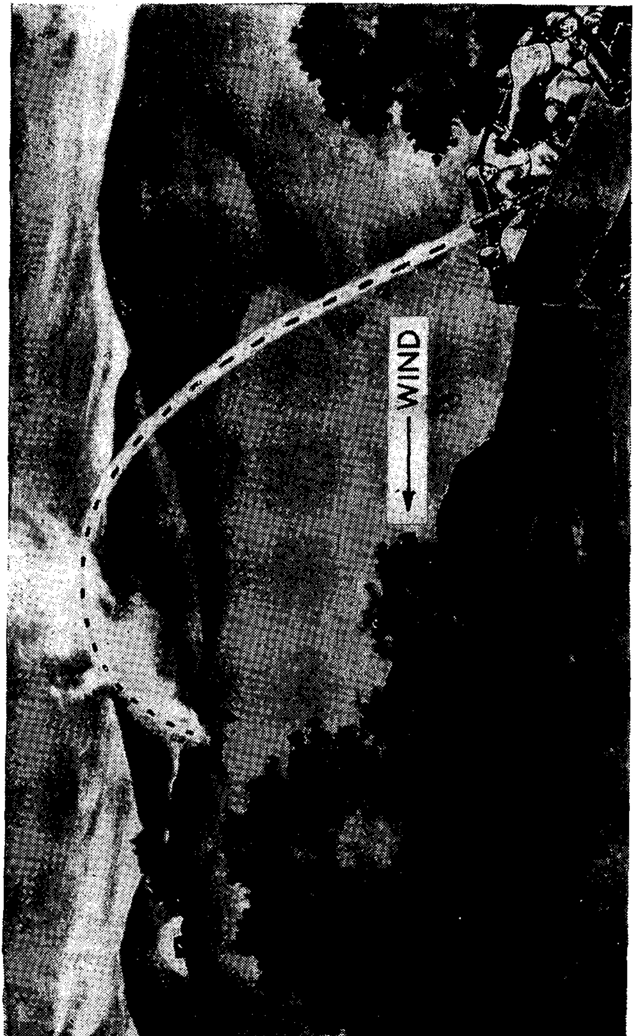


FIGURE 12.—If wind is below 3 miles per hour it may shift, and target will not be screened.



FIGURE 13.—On hot days in bright sunlight smoke is apt to rise vertically.



FIGURE 14.—Heavy rain clears the air of smoke.



FIGURE 15.—Overcast sky and 3- to 6-mile wind are best for smoke cloud.

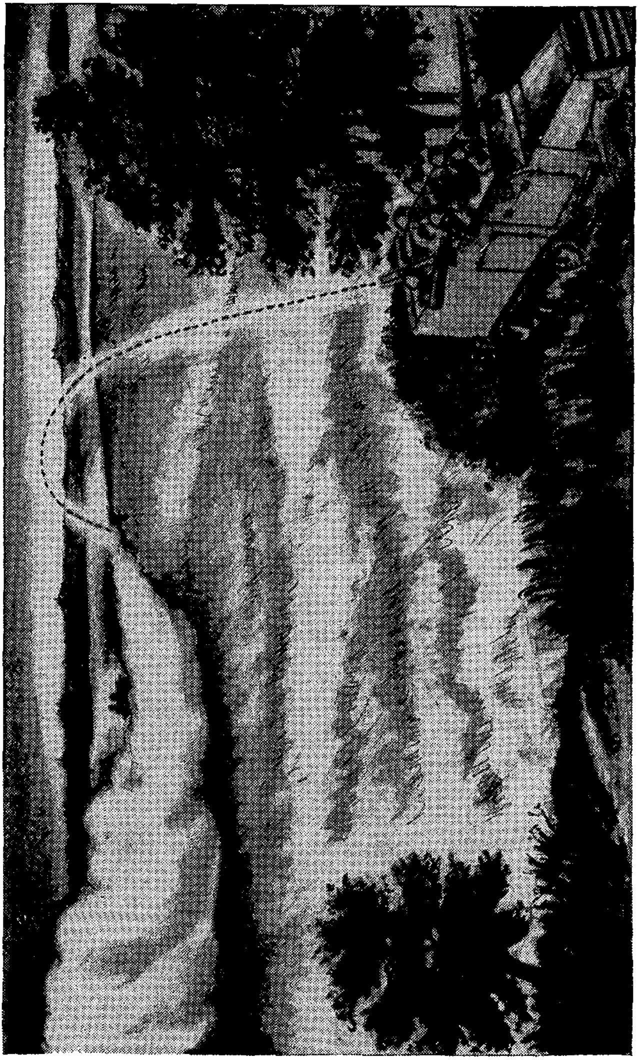


FIGURE 16.—On open level ground fire first shot to windward.



FIGURE 17.—In wooded or rugged terrain fire first round on line gun-target. Fire next shot to windward after observing fire.

■ 12. CHARACTERISTICS OF SMOKE CLOUDS.—*a*. The smoke cloud as it drifts with the wind spreads and rises, becoming more and more diffuse until it finally becomes ineffective. The lower part of the smoke cloud moves more slowly than the upper part. This is called the drag and is more noticeable on terrain covered with vegetation than on bare ground. The speed of the drift depends upon wind velocity and vegetation. With a 3- to 6-mile-an-hour wind, smoke from the 81-mm

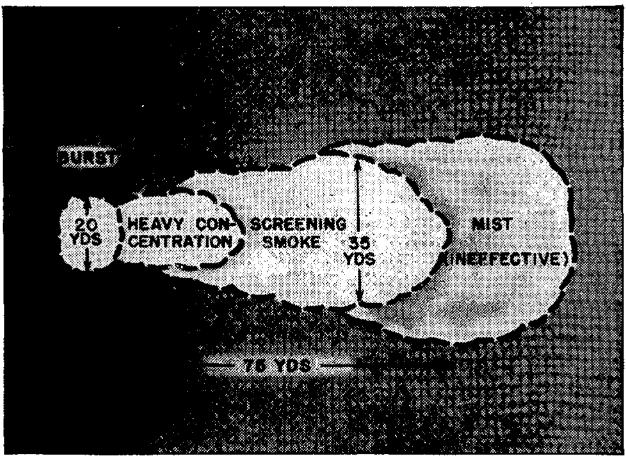


FIGURE 18.—Spread of smoke cloud.

smoke shell will give an effective screen for 75 yards down wind from the point of burst.

b. The spread and rise of the smoke cloud under normal conditions will be 20 percent of the distance traveled. Thus at 75 yards from the point of burst the cloud will be 25 yards high and 35 yards wide. The rise must be considered when placing smoke in front of a target on a hill. The spread must be considered when placing smoke in a head or following wind.

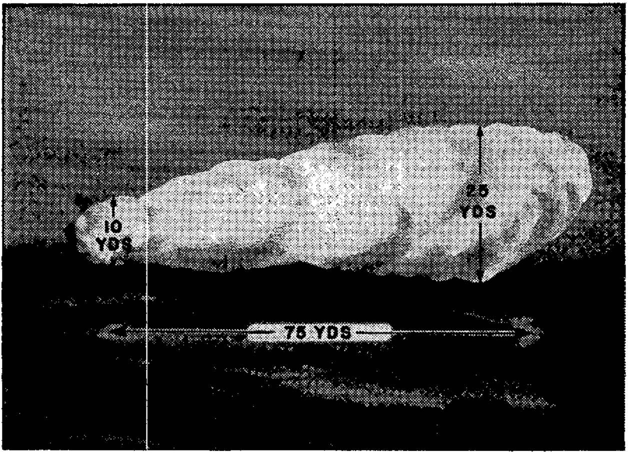


FIGURE 19.—Rise of smoke cloud.

■ 13. EFFECT OF POSITION OF SMOKE SCREEN ON FIRE.—Tests have shown that fire is much less effective when smoke is placed on the firer than when placed on the target. This applies particularly to rifle fire. Machine guns in defense may still fire effectively on their final protective lines. Antitank guns are practically useless when under smoke except when sited to cover a very narrow defile. Artillery may fire previously prepared concentrations but new targets cannot be effectively engaged without observation. Figure 20 shows the comparative effect of fire when smoke is used. Note that smoke placed on the enemy gives you a four-to-one advantage. (See TM 3–305.)

■ 14. POSITION OF SMOKE SCREEN TO SECURE MAXIMUM EFFECT.—A comparatively small amount of ammunition is carried and resupply is difficult. It is therefore necessary to place each shell where it will do the most good. The extent of the screen will depend upon width of the target and of the force to be screened, terrain, and the maneuver contemplated.

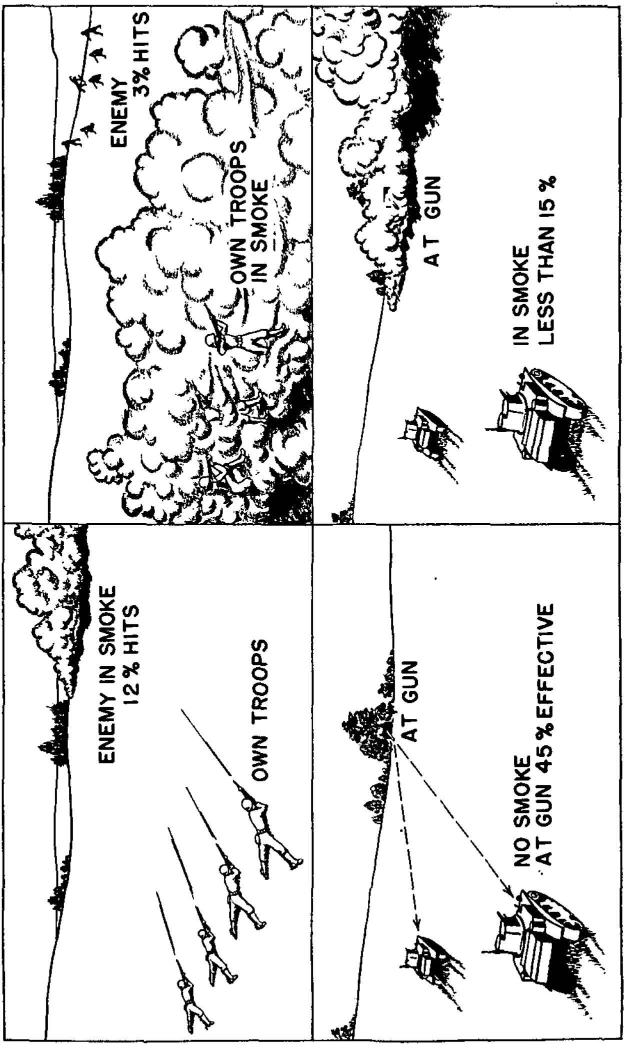


FIGURE 20.—Effectiveness of smoke.

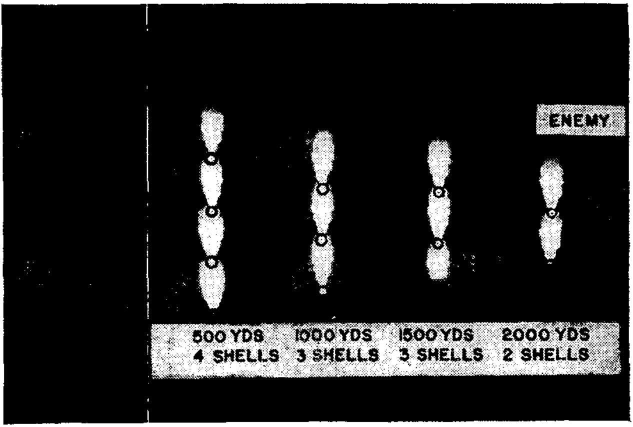


FIGURE 21.—Screening effect of smoke. When enemy position is narrower than unit front to be screened, less smoke is needed if placed near enemy.

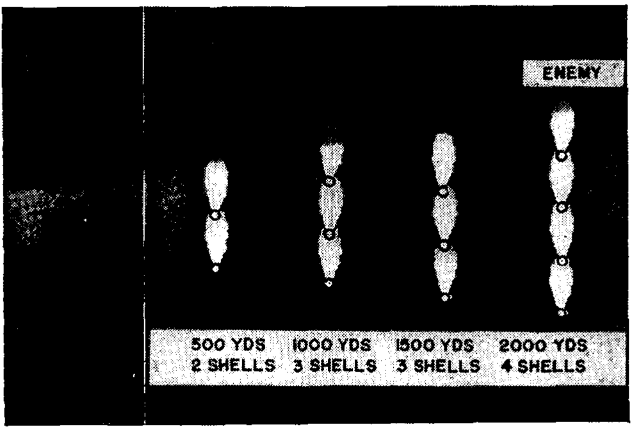


FIGURE 22.—Screening effect of smoke. When enemy position is wider than object to be screened (tank platoon) less smoke is needed if placed near platoon.



FIGURE 23.—When target is on steep hill do not place smoke far down slope. Smoke will not rise enough to screen target.



FIGURE 24.—Place smoke up slope so it will rise in front of target.

a. Screening target with flank wind.—From the standpoint of rapidity of establishing a screen and for economy of ammunition a flank wind is highly desirable. Figure 25 shows method of establishing a screen with a flank wind. If both screening and casualty effect is desired, place some shells directly on the enemy position

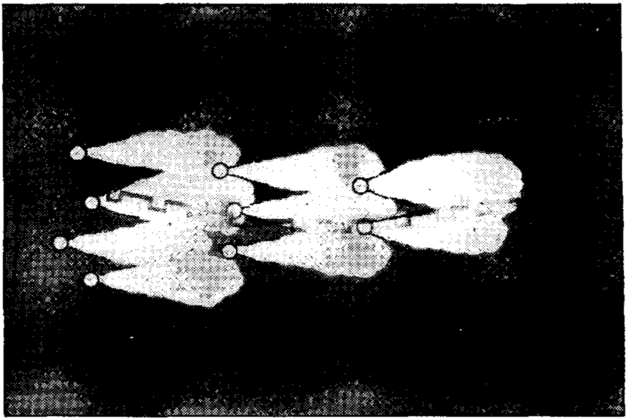


FIGURE 25.—Screening in flank wind. Fire first shell to windward flank of target and space other shells at approximately 50-yard intervals.

b. Screening with following wind.—Screening with a folling wind requires great ammunition expenditure but is most effective, as the smoke clears away while assaulting troops approach the enemy front position and continues to cover enemy rear positions. For screening effect only, fire 50 to 75 yards in front of the enemy position. For casualty effect place some shells on the enemy position.

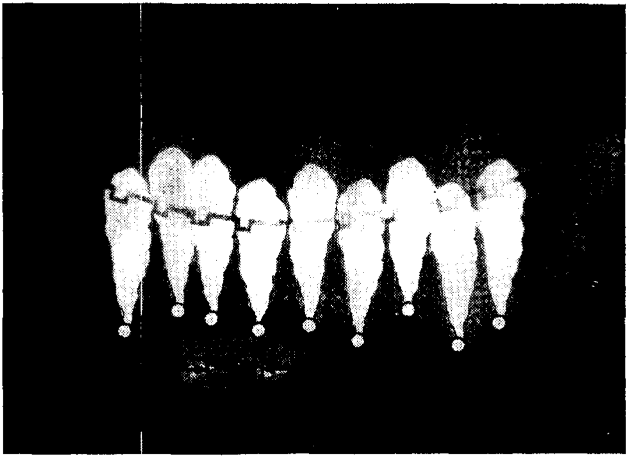


FIGURE 26.—Screening with following wind. Fire 50 to 75 yards in front of enemy position and space shells about 25 yards apart.

c. Screening with head wind.—This is the most difficult condition for screening for attacking troops. Timing must be

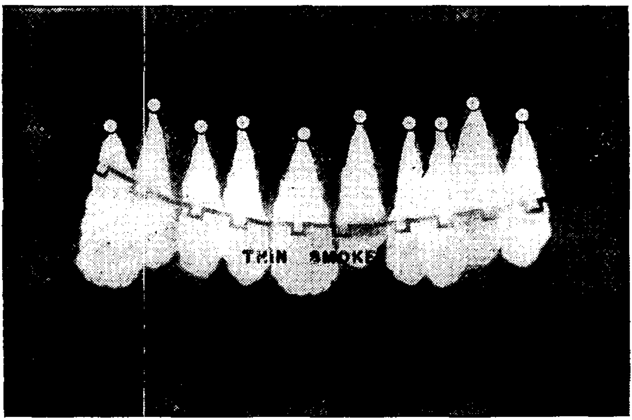


FIGURE 27.—Screening with head wind. Place center of impact about 50 yards behind target, spacing shells about 25 yards apart.

right or the smoke will not clear from the position before the attacking troops arrive or will clear too quickly and give the defenders time to fire effectively.

■ 15. ESTABLISHMENT AND MAINTENANCE OF SMOKE SCREEN.—To establish a smoke screen, fire approximately twice as many rounds per minute as is required to maintain the screen. A screen may be maintained under normal conditions by firing one round per 50 yards of front per minute. The following table gives the ability of a mortar squad in establishing and maintaining a smoke screen:

Direction of wind	Rounds per 100 yards' front per minute		Normal front that can be covered
	To establish	To maintain	
Flank	2	1	300
Head or following	4	2	150

Maintenance of the screen on a wide front depends upon whether or not the mortar carrier has to be shifted to cover the front. If shifting is required firing will be slower.

■ 16. TIMING.—Paragraph 9 lists some of the many uses of smoke. Smoke to be effective must be placed at the proper time. If it is placed too early, the maneuver may be disclosed and the enemy given time to adjust his defenses to meet the attack; also, ammunition is wasted. If it is placed too late, the attack may stall. In timing the smoke screen the time of flight of the projectile, the time of establishing the screen after the burst, and the time it takes troops to reach their line of departure or for a flanking unit to reach its assault position must be considered. One minute added to the time given in the table in paragraph 15 will give the time for establishing a screen after mortars are in position and firing data computed. Figure 28 gives an example of timing.



FIGURE 28.—Timing smoke screen. It takes tank platoons 5 minutes to get in position for assault. Mortars therefore open up 3 minutes after platoon leaves its position. Screen is maintained on the right for 1 minute after the tanks emerge from the woods. Smoke should be maintained on left of line longer than on the right.

■ 17. SUMMARY.—*a. General rules.*—The following may be given as general rules for employment of smoke:

(1) Against definitely located positions within effective range, use HE. Against targets that cannot be definitely located or targets that are out of range of the mortar but are still dangerous to supported troops, use smoke to support the attack unless by such use maneuver of other troops is interfered with.

(2) Smoke must not be used so that it will be in the approach to or on the objective when supported troops arrive at such points.

(3) Smoke should be used to blind enemy OP's. When terrain offers few suitable OP's to the enemy and he does not have control of the air, all suitable OP locations should be kept blinded by smoke.

b. Conditions for use of smoke.—(1) *Favorable.*

Sky	Heavily overcast.
Time of day	Night or early morning.
Terrain	Level fields or water.
Ground	Colder than air.
Winds	Steady, 3 to 6 miles per hour.

(2) *Average.*

Sky	Partly overcast.
Time of day	Midmorning, late afternoon.
Terrain	Moderately rolling farm land.
Temperature	Air and ground nearly same temperature.
Winds	Slightly shifting, 8 to 12 miles per hour.

(3) *Unfavorable.*

Sky	Clear.
Time of day	11 AM to 4 PM.
Terrain	Rugged or wooded.
Ground	Much hotter than air.
Winds	Variable, below 3 miles per hour or above 9 miles per hour.



FIGURE 29.—Do not use smoke against definitely located hostile weapons within range of assault guns or other supporting weapons.

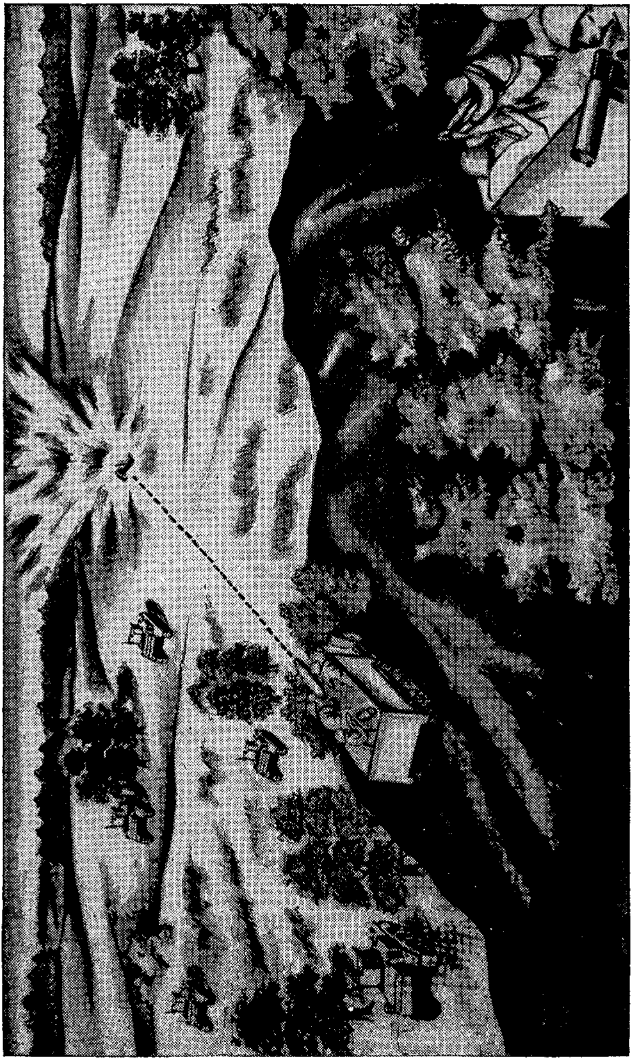


FIGURE 30.—Assault gun fire or HE shell should be used to destroy such weapons (see fig. 29).

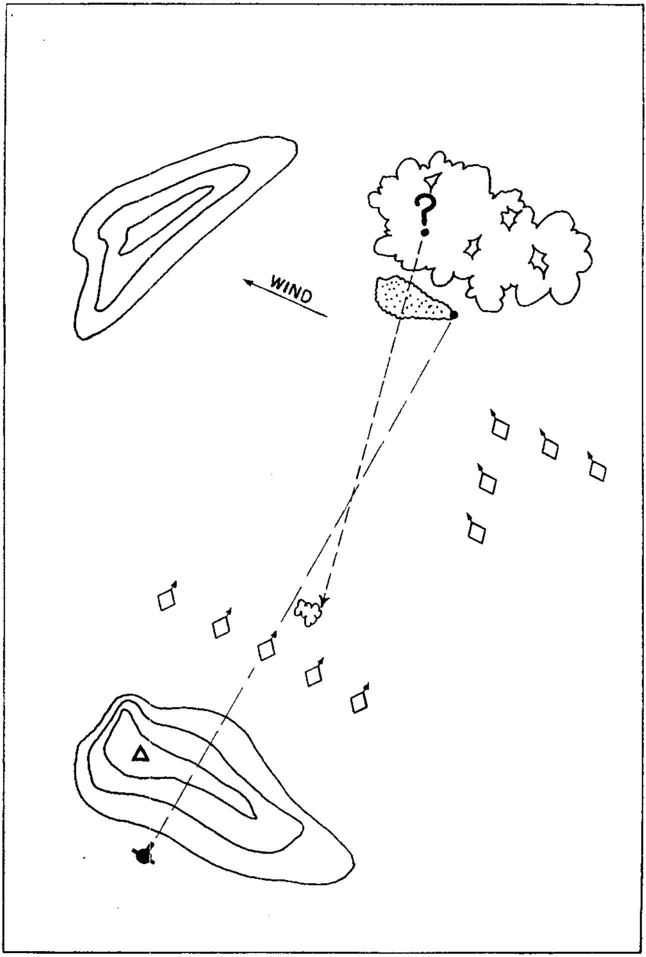


FIGURE 31.—Use smoke to screen weapons not definitely located or out of range of HE.



FIGURE 32.—Do not use smoke so that it will interfere with adjacent troops.



FIGURE 33.—Use only enough smoke to screen troops you are supporting.

Section III

CONTROL, ORDERS, LIAISON, MAINTENANCE

■ 18. Control.—*a. General.*—Control is exercised by—

(1) Giving specific orders as to routes, directions, boundaries, missions, firing positions, objectives, and rallying points.

(2) Use of radio.

(3) Use of signals.

b. Radio.—(1) The platoon leader has an SCR–510 radio set. This set is short range and has two pre-set channels, either of which is immediately available by turning a switch. Each mortar squad has one SCR–510 radio set and one SCR–509 set. The latter is portable and can be carried forward by the observer. The radio sets have spare crystals which may be installed to provide radio communication with a company to which the squad or platoon might be attached. Radio communication between the companies and the mortar platoon or squad may also be obtained over the battalion command net.

(2) Radio procedure is simple. Messages must be clear and short. When the platoon leader conducts fire of the platoon as a whole he should cause one of the squad SCR–509 radio sets to stay on the battalion frequency. This set is taken to the OP. When a mortar squad is attached to the company, the squad leader when not conducting fire keeps his SCR–509 radio tuned to the company frequency or a common channel previously agreed upon.

(3) It is the duty of the communications sergeant under direction of S–3 to see that the mortar platoon is supplied with the crystals for proper radio channels. However, the platoon leader must check on this. In bivouac prior to the march the platoon leader personally checks to see that he and each of his squads have the necessary crystals to communicate with the battalion and with each combat company. He personally interviews each company commander and arranges for emergency channels to be used. Should a squad be attached to a platoon, the mortar platoon leader must assure himself that the squad can communicate by radio with the unit to which attached.

c. Signals.—Signals are prescribed in FM 17–5, 23–90, and 23–91.

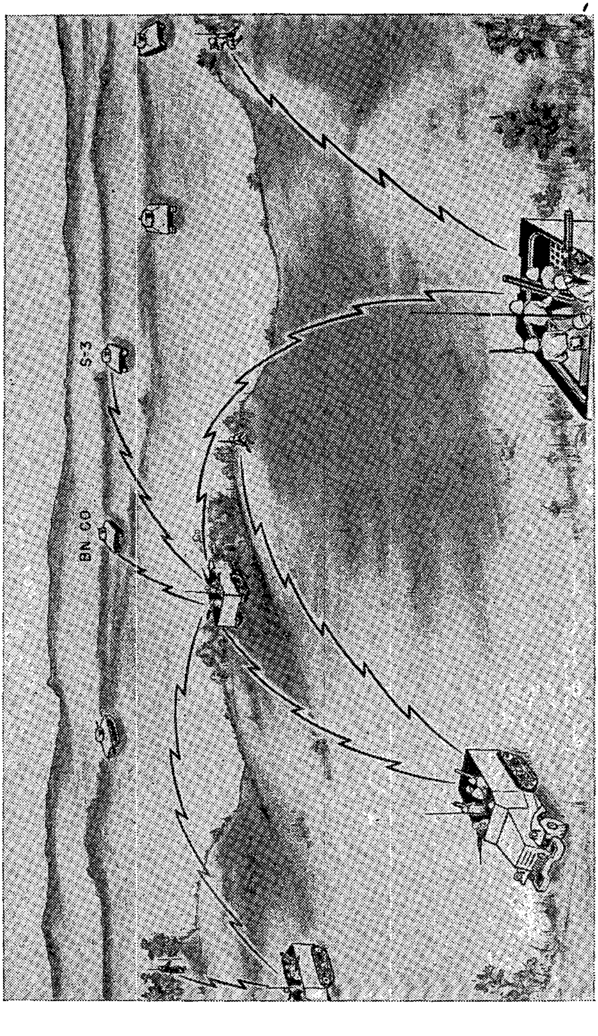


FIGURE 34.—Radio communication, mortar platoon. In addition to nets shown, the platoon leader and each squad leader may communicate with each company by changing crystals.

■ 19. ORDERS.—Orders consist of combat orders and fire orders.

a. Fire orders.—Fire orders are covered in FM 23–90 and 23–91.

b. Combat orders.—Combat orders for the mortar platoon and squad are invariably oral and follow the sequence prescribed in FM 101–5. They should be clear and concise. Enough information must be included so that each man knows the mission of the battalion or company to which the mortar unit is attached, and the mortar platoon or squad. Orders should be given to leaders from a point where initial targets can be pointed out.

■ 20. LIAISON.—Liaison with the battalion or combat company is maintained chiefly by radio as prescribed in paragraph 18. The platoon has no men except members of mortar squads or, in the case of the infantry battalion mortar platoon, one of the riflemen from platoon headquarters for liaison purposes. In bivouac, assembly areas, and at rallying points, the platoon leader sends a runner to the battalion CP or to the company CP if the platoon is attached to a company.

■ 21. MAINTENANCE.—Maintenance for the platoon other than crew maintenance is performed by the maintenance section of the battalion headquarters company or the maintenance section of the unit to which the mortars may be attached.

SECTION IV

SECURITY

■ 22. GENERAL.—FM 100–5 covers in general the subject of security. Security is a responsibility of command. The commander of the whole force is responsible for the security of the command as a whole. Each lower commander is responsible for local security. (See FM 17–10.)

■ 23. GENERAL SECURITY MISSIONS.—The mortar squad and platoon are fitted into the general security measures taken to protect the command as a whole. They may be attached to advance, flank, or rear guards, and to outposts. In such cases the mortar squad and platoon perform their usual supporting role.

a. Advance and flank guards.—As part of such security

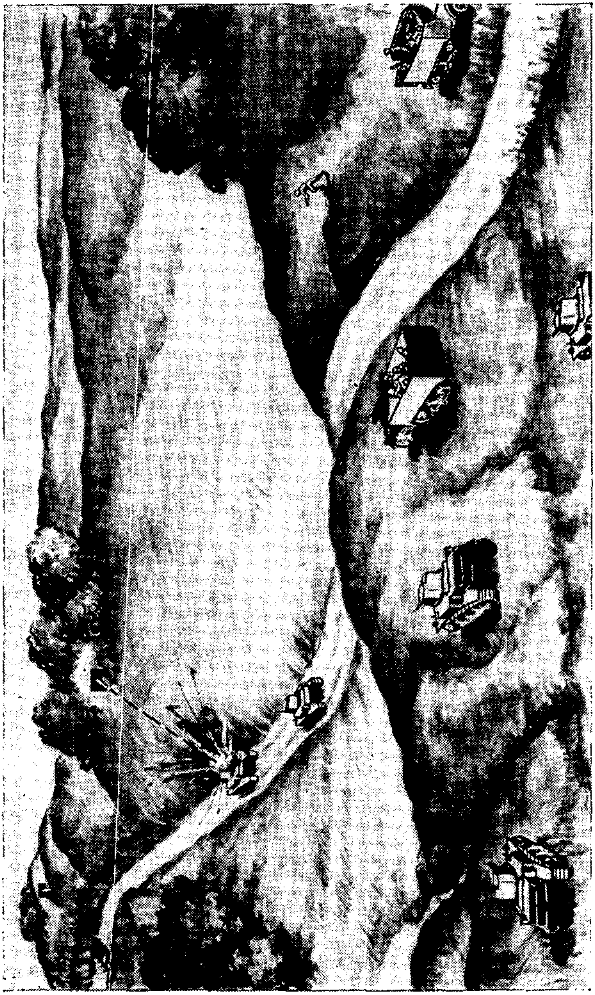


FIGURE 35.—In a meeting engagement such as advance guard action do not waste time by seeking excellent defiladed positions.

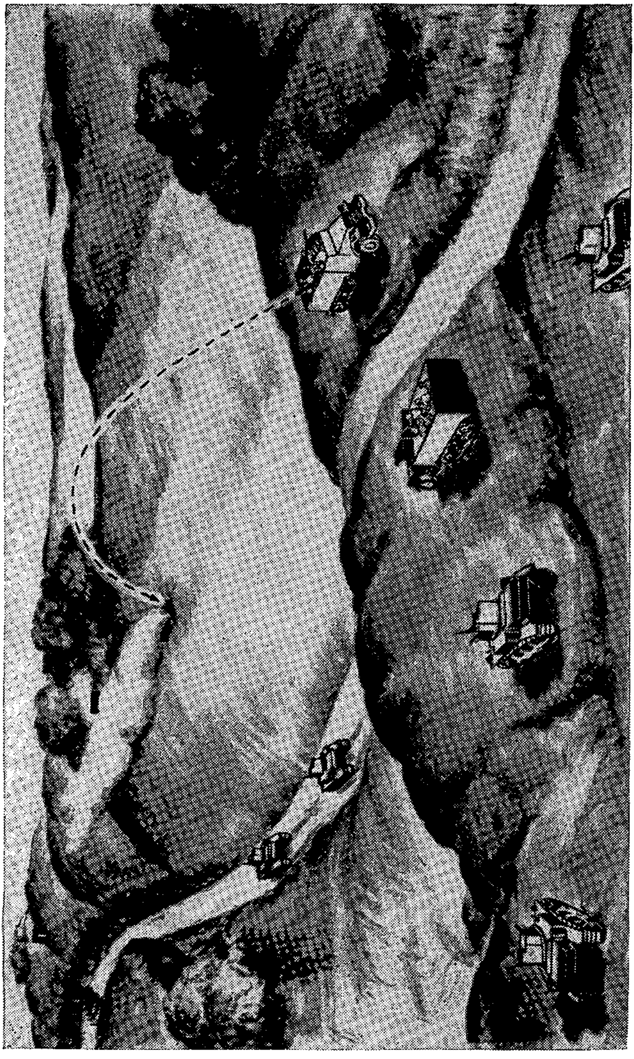


FIGURE 36.—Move mortar carrier near top of hill just below crest and immediately open fire.

detachments, a mortar squad, and less frequently the entire mortar platoon, is attached to the advance or rear party or similar element in the flank guard. With an advance or flank guard the mortars are placed normally at the rear of the advance party. They must be ready to go into position quickly to support any action of the advance party and subsequent action of the remainder of the advance guard. Little time will be available for selection of position and computation of fire data. Mortar carriers are moved at once into position from which fire may be brought on the enemy. The mortar carrier may and often will be situated so that fire may be placed on the enemy by direct laying.

b. Rear guards.—In rear guards the mortars are usually placed at the head of the rear party. They may go into position on or near the crest of a hill or in the edge of woods from where they may bring quick effective fire on the enemy. The OP should be not more than 50 yards from the vehicle. The mortar withdraws by bounds and the squad leader must not let himself get cut off.

c. Security at assembly areas, attack positions, and rallying points.—At assembly areas, attack positions, and rallying points, mortars are placed to cover favorable avenues of hostile approach. They are fitted into the general scheme of security.

d. Outposts.—As part of an outpost the mortar squad or platoon is normally part of the reserve. As such it must be ready to move with the reserve to repel a counterattack. The mortar unit commander must know the mission of the reserve and its plan of action. He institutes route and position reconnaissance and must be ready to move promptly into position to support the reserve. At times the mortar may be placed in position to cover particular avenues of hostile approach.

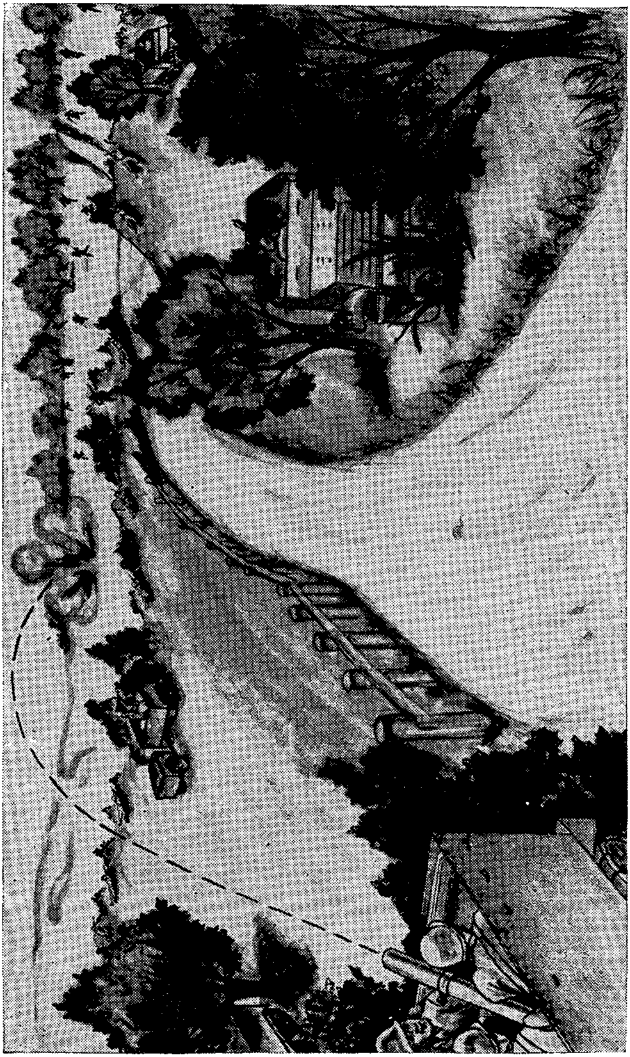


FIGURE 37.—In rear guard action do not place mortar far down slope where communication will be difficult.



FIGURE 38.—Place mortar near top of hill or forward edge of concealment, so that immediate, well-directed fire may be brought on enemy.

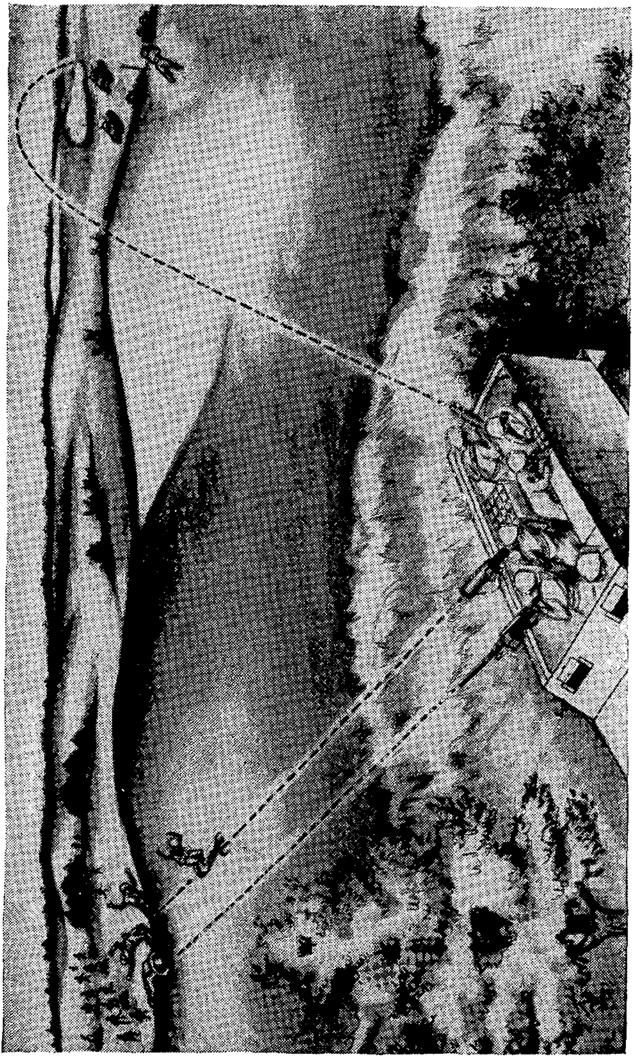


FIGURE 39.—Use vehicular machine guns for local protection.

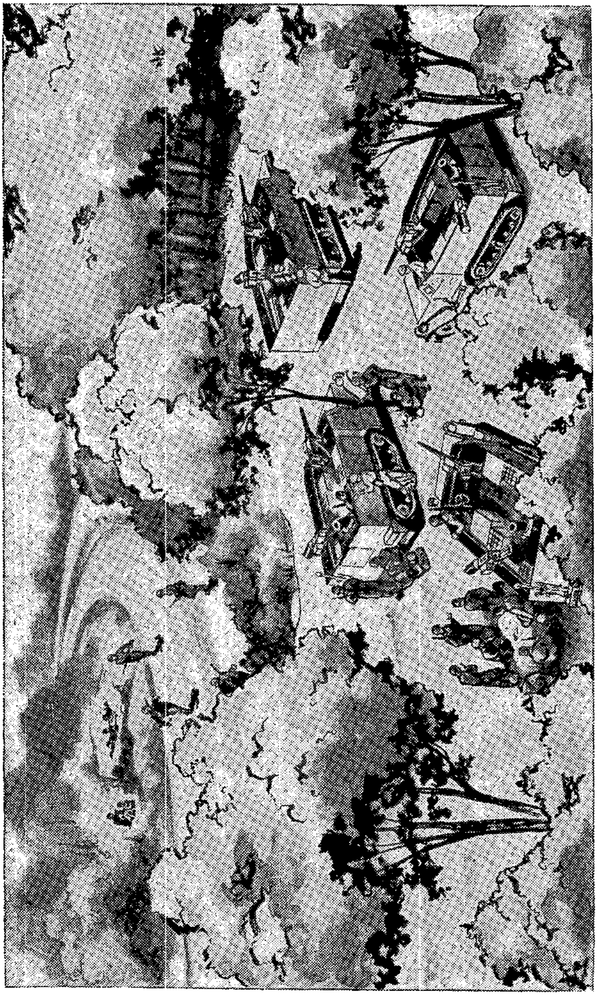


FIGURE 40.—At assembly areas, attack positions, and rallying points, do not sit and do nothing. Do not crowd vehicles into a small area. Space them at least 50 yards apart. This is a profitable air or artillery target.

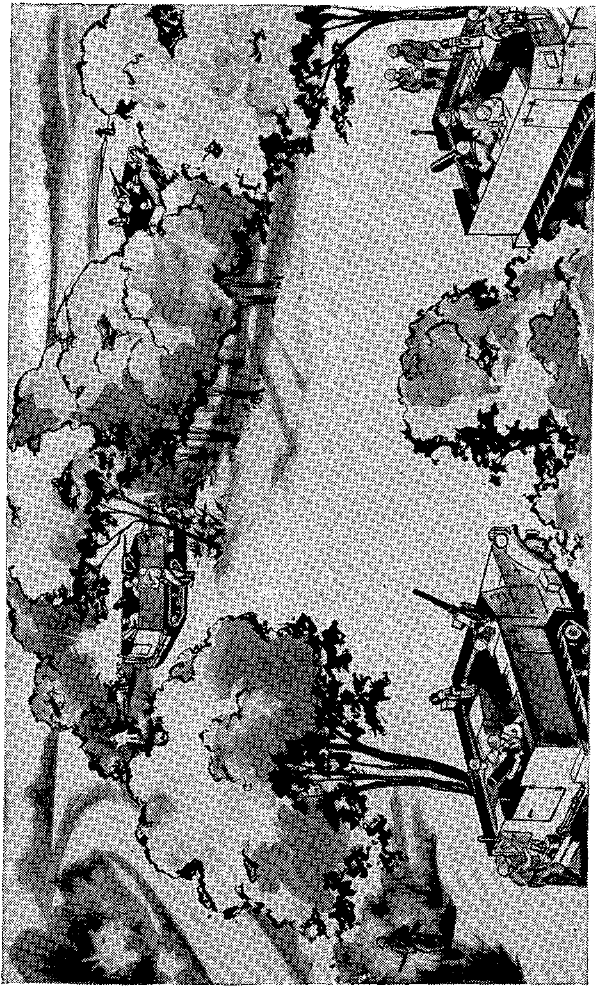


FIGURE 41.—Place mortars where they can fire on approaching enemy. Have some men in vehicle ready to fire mortar or man vehicular weapons. Disperse vehicles.

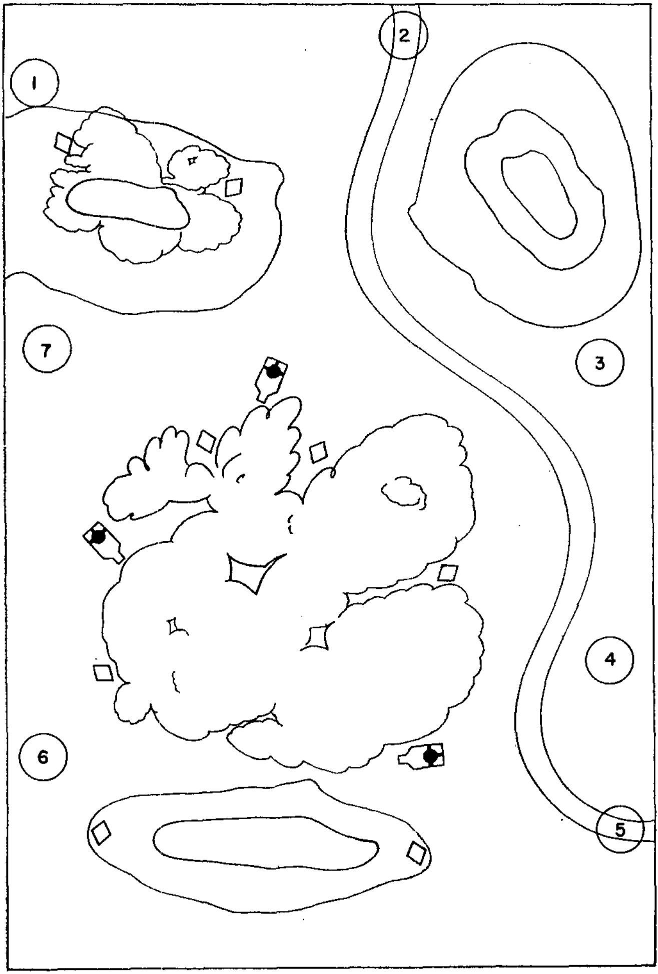


FIGURE 42.—In rallying position place mortar to cover reorganization. Prepare to place smoke or shell on favorable avenues of approach. This is one plan only. Numbers indicate planned fires.

■ 24. LOCAL SECURITY.—On the march and at bivouac, assembly area, attack position, or rallying point the mortar platoon and each squad must take care of its own local security.

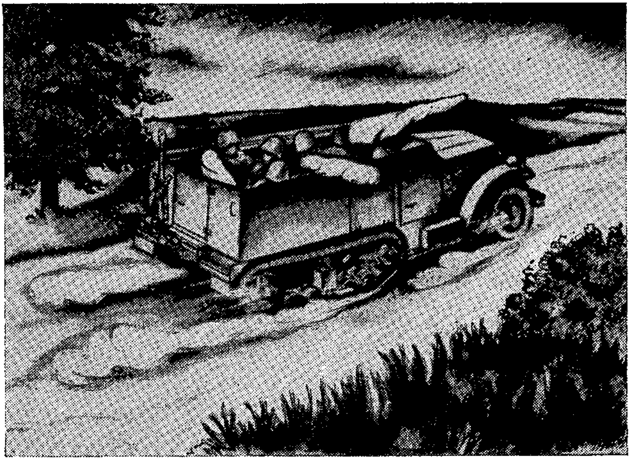


FIGURE 43.—Do not march with gun covers on and guns locked in position.

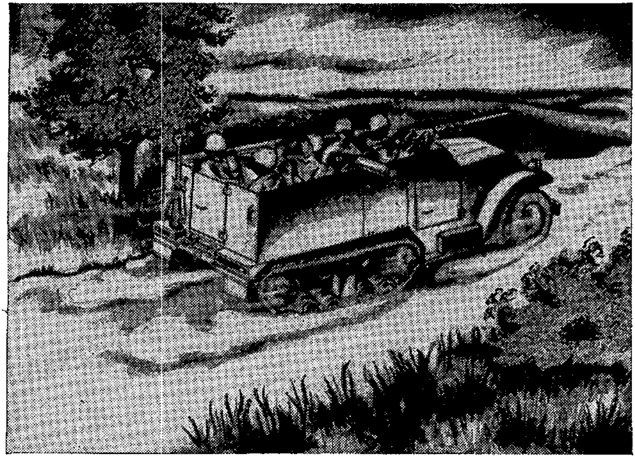


FIGURE 44.—Remove gun covers. Set guns for probable direction of fire and clamp them lightly.

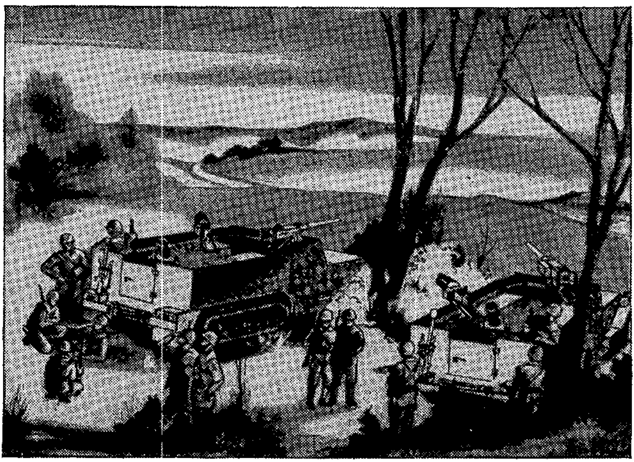


FIGURE 45.—At halt men should not lie around and do nothing.

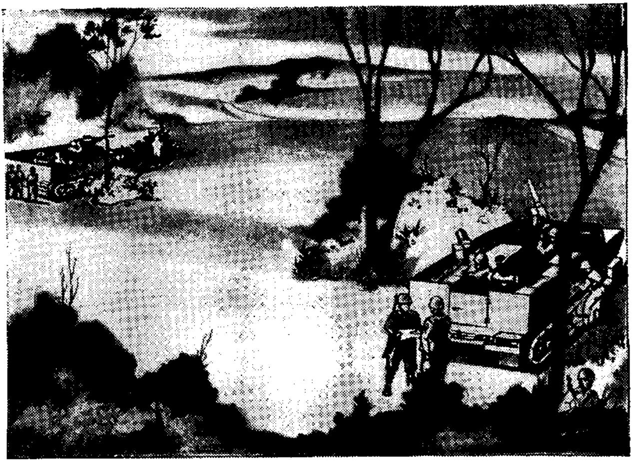


FIGURE 46.—Keep air and ground sentinel alert. Keep crews close to car. Have at least one gun manned.



FIGURE 47.—During combat, detail driver as air and ground alert sentry. He mans one of machine guns.

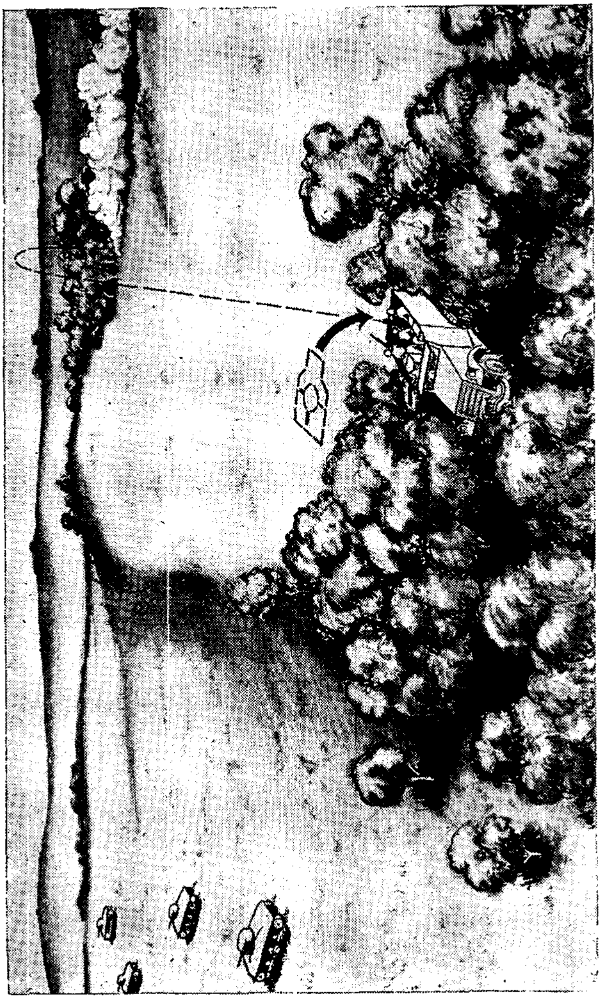


FIGURE 48.—If attacked by hostile tanks, shift mortar position and fire smoke shell in front of tanks. If tanks are too close for use of smoke shell, use smoke grenade and withdraw. Notify battalion commander.

SECTION V

MARCHES, RECONNAISSANCE, POSITIONS

■ 25. MARCHES.—The subject of marches is covered in FM 100–5, 17–10, and 17–50. March training and march discipline are the foundation for successful movement to assembly areas, occupation of firing positions, and attack. Marches must be conducted in a military fashion at all times. They are not joy rides, during which everyone except the driver enjoys the scenery or goes to sleep.

■ 26. DUTIES AND POSITION OF PLATOON LEADER.—*a*. During the march the platoon leader is responsible for march discipline. When not required to be with the battalion commander the platoon leader marches at the head of his platoon and frequently observes the other platoon cars. He is responsible for the rate of march, route, and march discipline.

b. When contact is imminent the platoon leader will frequently march near the head of the battalion behind the executive or battalion commander where he will be immedi-

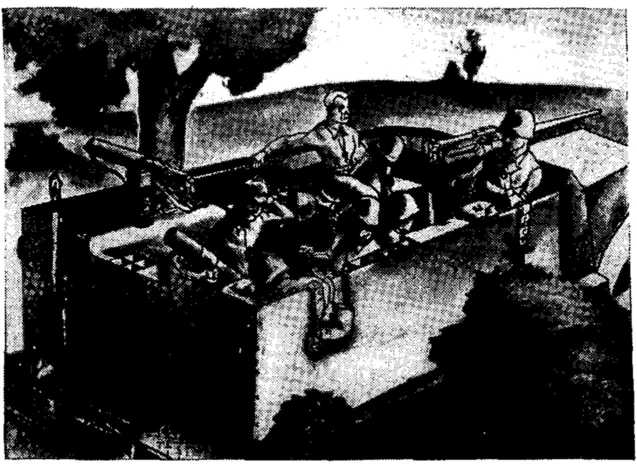


FIGURE 49.—Do not remove equipment and go to sleep.

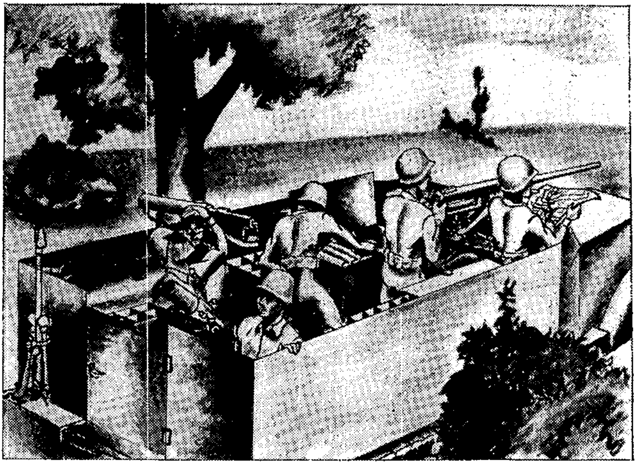


FIGURE 50.—Have air sentinel and navigator on duty. Remain alert.

ately available to receive orders. In this case the senior mortar squad leader conducts the march.

■ 27. DUTIES OF CREW.—*a. Squad leader or car commander.*—(1) Checks to see that the driver performs proper vehicle checks. (See FM 17–5.)

(2) Checks equipment to see that it is present, serviceable, clean, and properly secured.

(3) Checks to see that radio is functioning properly or sees that the radio tender, if one is assigned, checks the radio.

(4) Appoints a car navigator, either himself or some member of the crew. The appointment of a navigator does not relieve the car commander of the responsibility for maintaining the prescribed speed, distance, and route.

(5) Appoints an air sentinel. This duty must be rotated frequently.

(6) Requires two men to remain alert, ready to man the caliber .30 and caliber .50 machine guns.

(7) Except when in the immediate presence of the enemy,

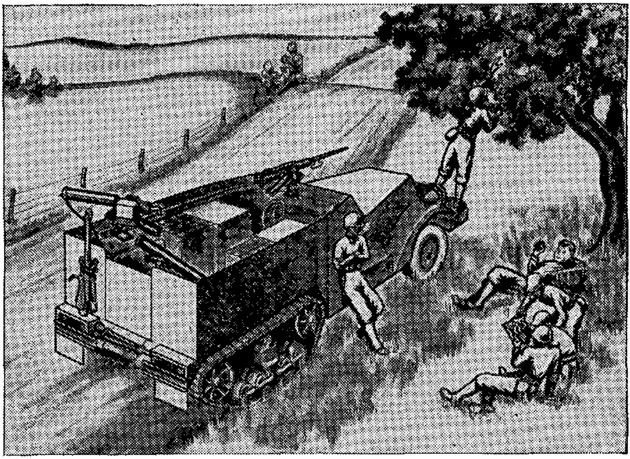


FIGURE 51.—Do not remain idle at a halt.

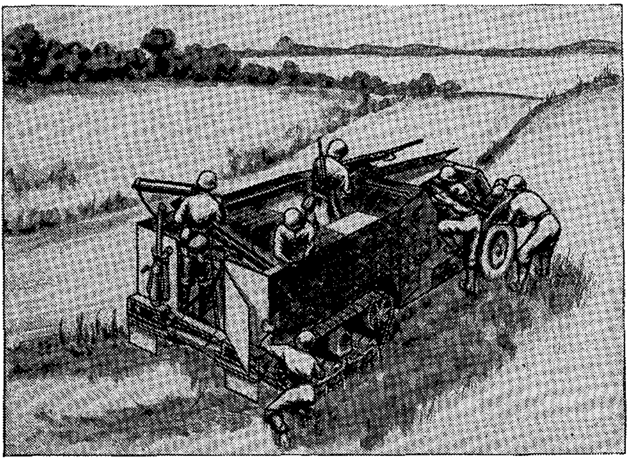


FIGURE 52.—Vehicle commander is responsible that all members of crew perform their duties at a halt.

crew members not given duties as above are permitted to relax in order that they may be in condition to take their turns at the duties. On forced marches, the car commander should encourage the crew members not on duty to sleep.

(8) When in the immediate presence of the enemy, all members of the crew are alert, defense machine guns are half-loaded, and carbines and submachine guns are kept ready at hand.

b. Navigator.—The navigator is the guide. He must know the prescribed speed, the distance between vehicles, his place in column, and the route. He must have a map or sketch of the route or written directions of where to go and how to get there. He sets the odometer trip mileage to zero at the start of the journey and as the march progresses he jots down the mileage to crossroads and other important features and notes the time each is reached or passed. At all times the navigator should know the general direction of travel and should keep himself oriented by means of a compass, the sun, or the stars. Thus, if a wrong turn is taken, it will be promptly noted. The record of mileage will enable rapid back-tracking to the route.

■ 28. FORMATIONS.—Two formations may be used by the platoon: column, for road marches; and line for deployment.

■ 29. RECONNAISSANCE.—Reconnaissance as it applies to the mortar platoon consists of reconnoitering for firing positions and routes thereto. The rapid advance of tanks and infantry on carriers requires that no time be wasted in search of ideal routes or firing positions; otherwise continuous support cannot be given to the advancing units.

■ 30. ROUTE RECONNAISSANCE.—*a.* For the mortar platoon such reconnaissance consists primarily of reconnoitering routes from the attack positions to initial firing positions and for displacement.

b. The mortar platoon leader, leaving the platoon to be conducted to the attack position by the senior squad leader when the battalion moves forward, goes with the battalion commander on reconnaissance. He receives the battalion

plan of action or attack order and from his map tentatively selects routes and positions. At the attack position, he inspects routes from the attack position to front firing positions and observes as far forward as practicable, selecting routes for displacement and probable positions from which the attack may be supported.

■ 31. SELECTION OF POSITION.—*a*. The primary consideration in selecting mortar positions is that they must be within effective range of probable targets. They are preferably within

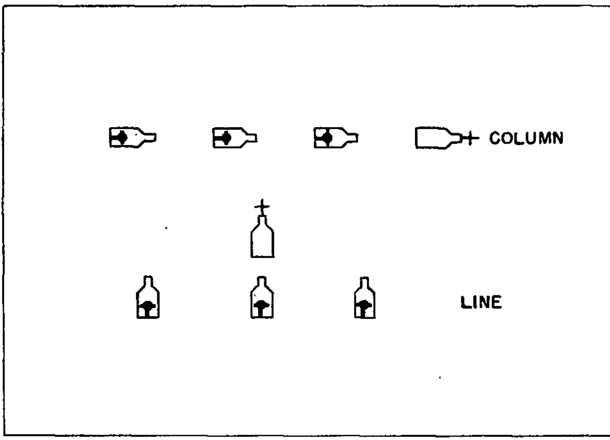


FIGURE 53.—March formations.

arm-and-hand signaling distance of the OP or better yet within voice distance. They should afford cover for the mortar and should be capable of being approached by routes concealed from the enemy. Normally positions will be on the reverse slope of hills. (See FM 23–90.)

b. Mortar positions should be separated by at least 50 yards so that one artillery shell will not affect more than one mortar.

c. In defense, alternate and supplementary positions are selected.

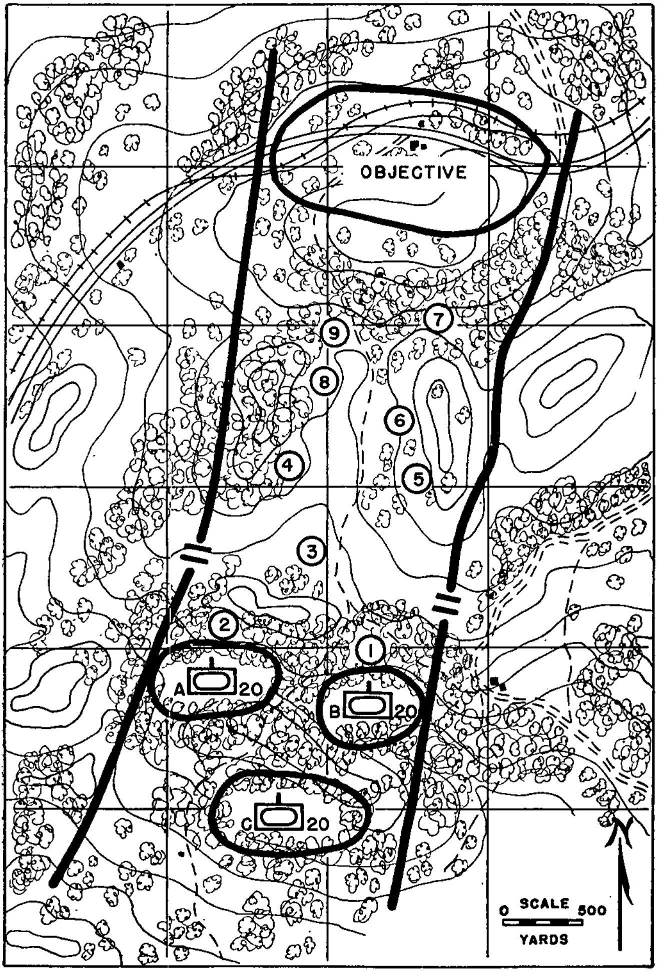


FIGURE 54.—Selection of routes and positions. From map study platoon leader tentatively selects positions from which he may support attack as it advances and routes to those positions. Numbers show suitable locations for mortars.



FIGURE 55.—Do not move across open country to firing positions.



FIGURE 56.—Take advantage of concealment in move to position.

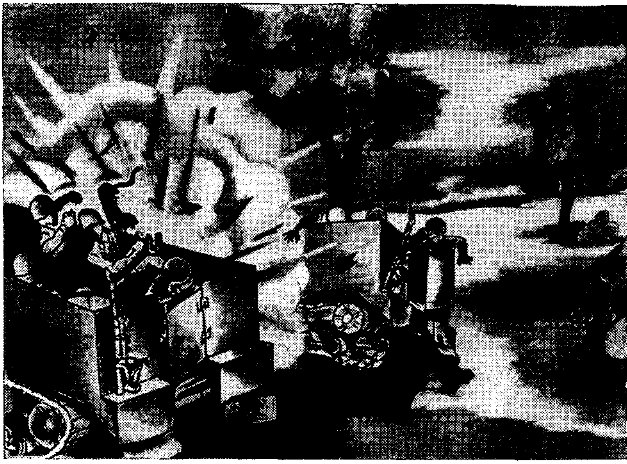


FIGURE 57.—Do not place mortars closer together than 50 yards. One artillery shell or air bomb may destroy two mortars.

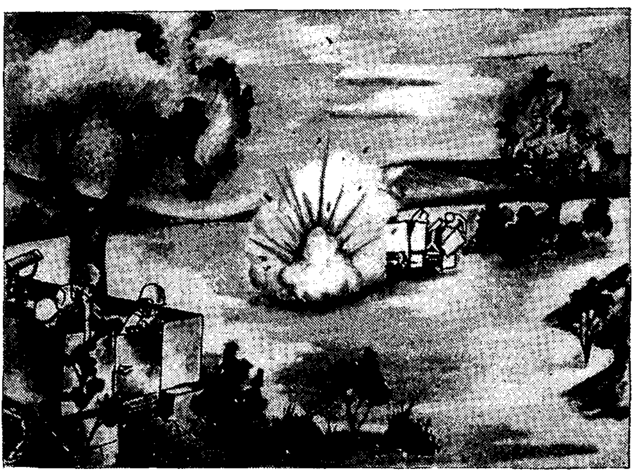


FIGURE 58.—Place vehicles at least 50 yards apart.

■ 32. POSITIONS IN OFFENSIVE ACTIONS.—*a*. In offensive actions when in support of tanks or mounted infantry, positions are usually near the crest of a hill where little time will be necessary for computing fire data. The mortar is fired from the carrier. Positions are selected for defilade and ease of approach rather than for concealment.

b. When supporting a dismounted infantry attack, positions may be farther down the reserve slope of the hill as

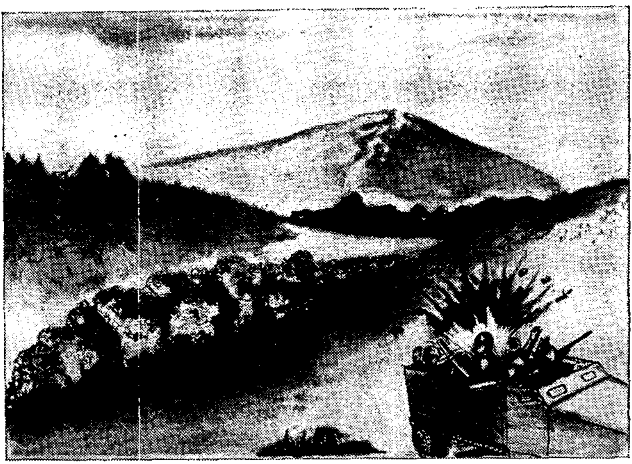


FIGURE 59.—Mortar should not be fired from forward slope of hill if suitable positions are available elsewhere.

more time will usually be available for computation of fire data.

c. Occupy positions quickly. Turn front wheels of the carrier as far to the right or left as practicable so that fire may be shifted by simply moving the car forward or back.

■ 33. POSITIONS IN DEFENSE.—*a*. In defense, positions are chosen for cover, concealment, and range to particular areas. The fires of the mortar are carefully coordinated with the fires of machine guns and artillery. Mortar targets are those



FIGURE 60.—Place mortar on reverse slope of hill.

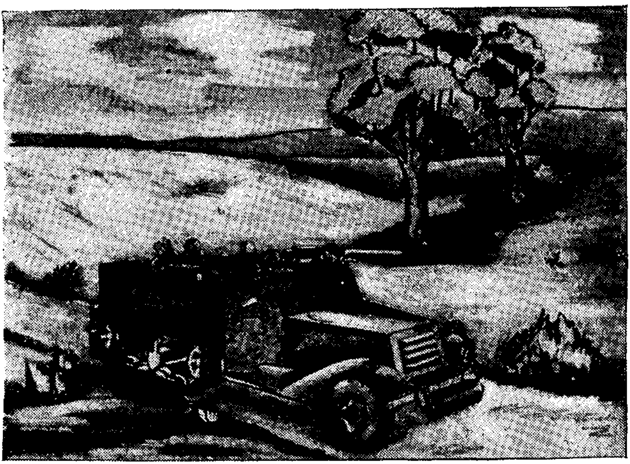


FIGURE 61.—Do not fire mortar from the open when concealment is available.



FIGURE 62.—Select position under trees.



FIGURE 63.—Do not place mortar where shells will hit overhanging limbs.



FIGURE 64.—Do not take position where field of fire is restricted. This position prevents mortar from firing on right of battalion zone.



FIGURE 65.—Place mortar where it can cover all targets likely to appear within its zone.

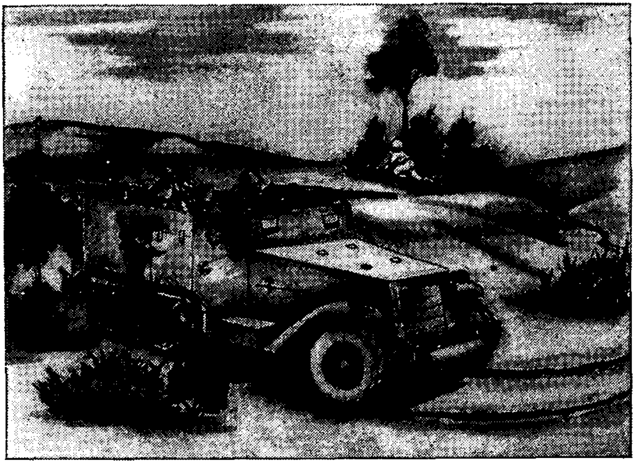


FIGURE 66.—In occupying a position turn front wheels so fire may be shifted by moving vehicle forward or backward.

areas of favorable approach that are defiladed to flat trajectory weapons.

b. Positions are carefully selected and firing data computed for the various targets. These data are placed on a range card. (See FM 23–91.)

c. Alternate and supplementary positions are selected. An alternate position is one from which original fire missions may be fired and which is occupied in case the primary position becomes untenable. A supplementary position is one to which the mortar is moved to fire on targets that cannot be reached from the primary or alternate positions.

■ 34. DISPLACEMENT.—*a. Support of mounted attack.*—In support of tanks the mortar platoon usually makes forward displacement by echelon. The platoon leader with one or two squads moves forward when the tanks have overrun the immediate mask to the front, while one or two mortars remain in place to protect the movement and take care of emergency targets. The displacement should start as soon as or before the advancing tanks have passed beyond effective



FIRUGE 67.—Do not displace all mortars at once. An emergency target may appear. Here mortar carriers are fired on by AT gun passed over by leading wave of tanks.



FIGURE 68.—Leave one or two mortars in position until new positions are occupied by forward echelon.

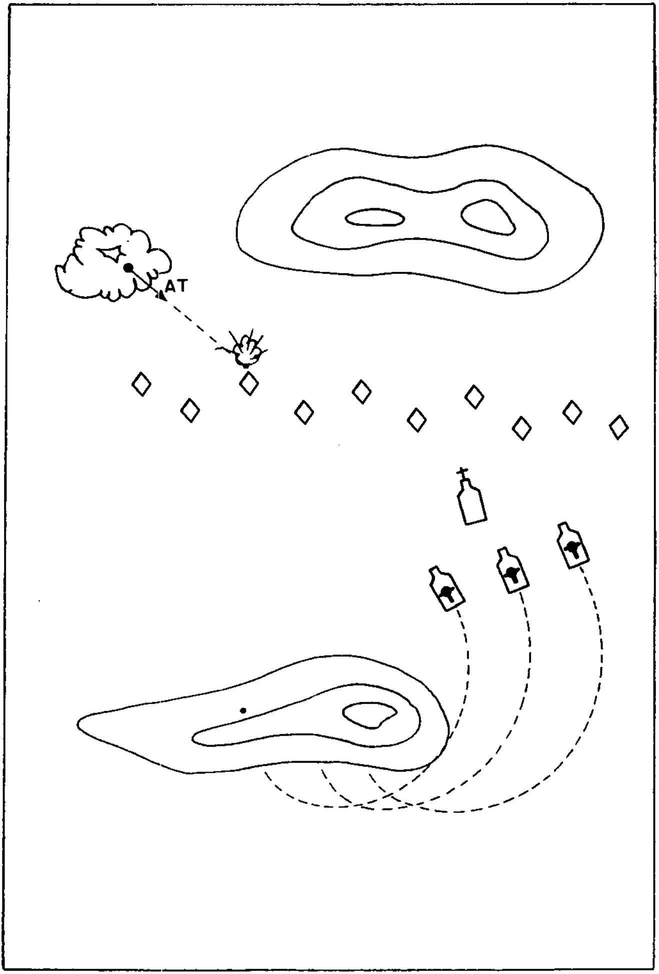


FIGURE 69.—Don't displace too soon. You will not be able to give the support possible. Here mortar platoon displaces too soon and tanks are fired on from flanks.

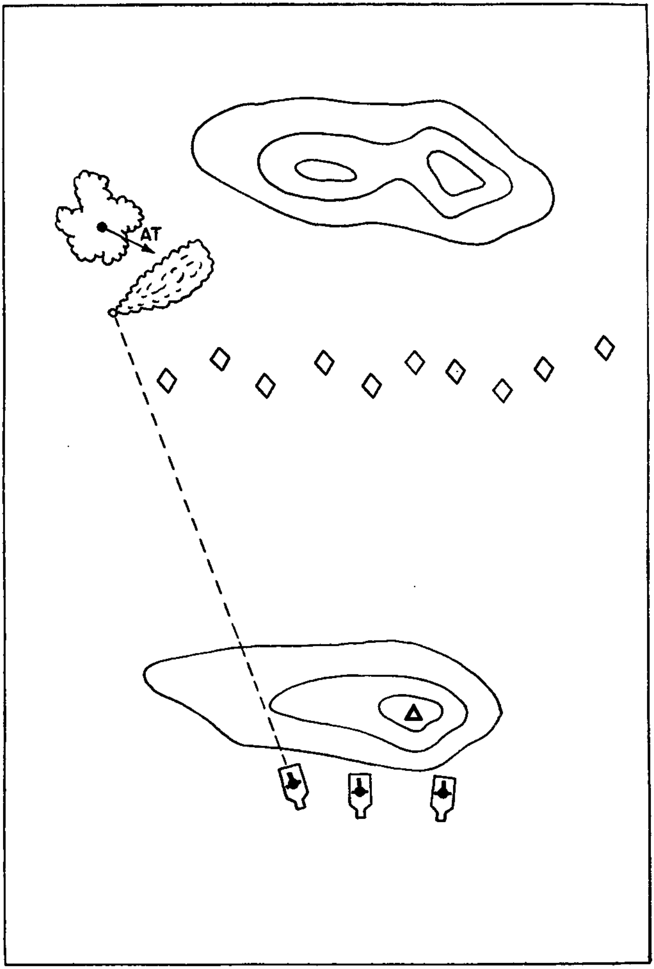


FIGURE 70.—Keep some mortars in position as long as adequate support can be given.

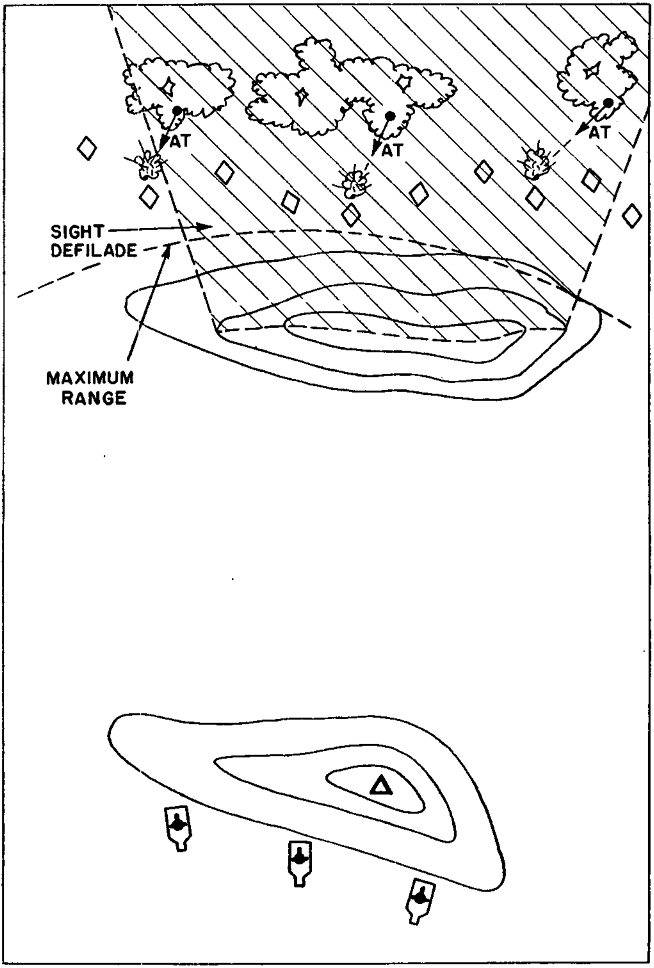


FIGURE 71.—Do not wait too long to displace or adequate support will not be given.

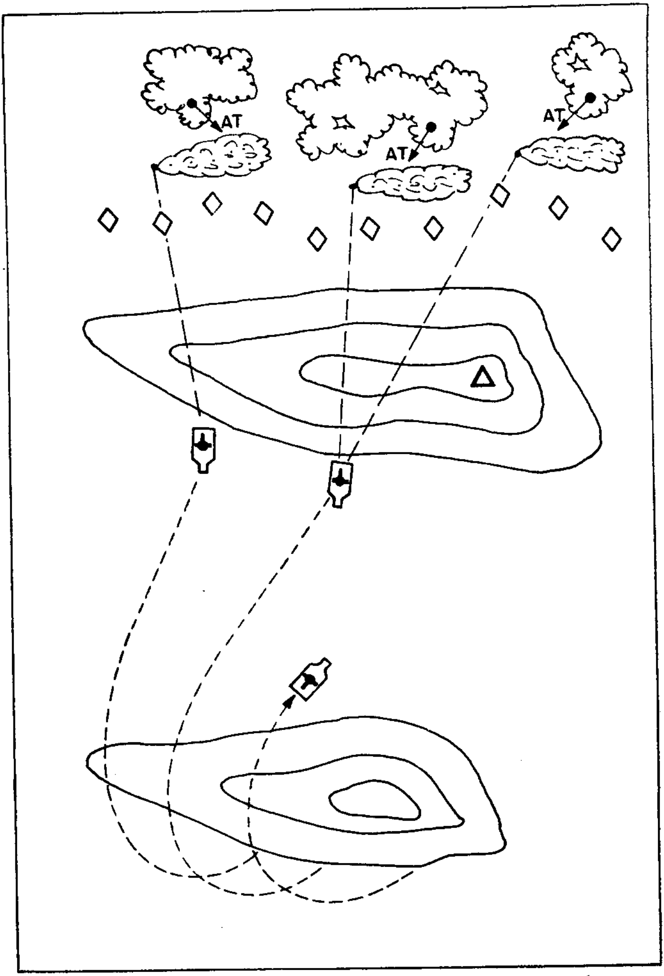


FIGURE 72.—Move forward to give continuous support.

mortar range or range of observation of fire. It should be made at maximum speed practicable. New positions from which support may be made are occupied as quickly as practicable. The rear echelon then moves forward. When a squad is supporting a company, it usually moves forward with the fire support platoon.

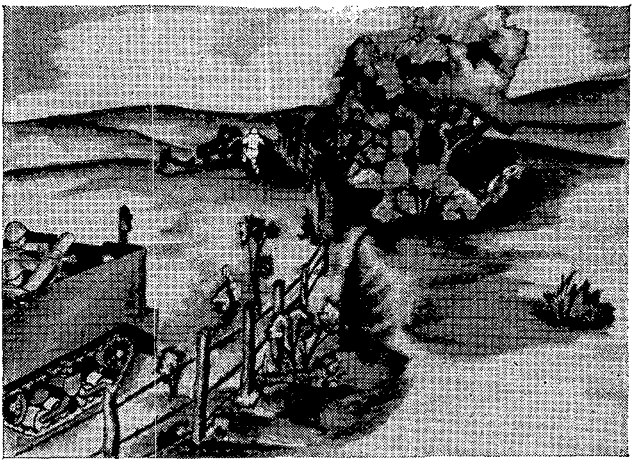


FIGURE 73.—Do not take position where part of zone cannot be seen.

b. Support of dismounted infantry attack.—The mortar platoon moves forward as soon as practicable after its fire is masked. Again the movement is usually by echelon.

■ 35. OBSERVATION POSTS.—Observation posts selected must afford a good view of the terrain over which the battalion will attack, must not be too prominent as they will draw fire, should be as close as practicable to the mortar position, and should afford cover and concealment both for the approach to the position and at the position itself. An OP on the line gun-target will facilitate computation of firing data.

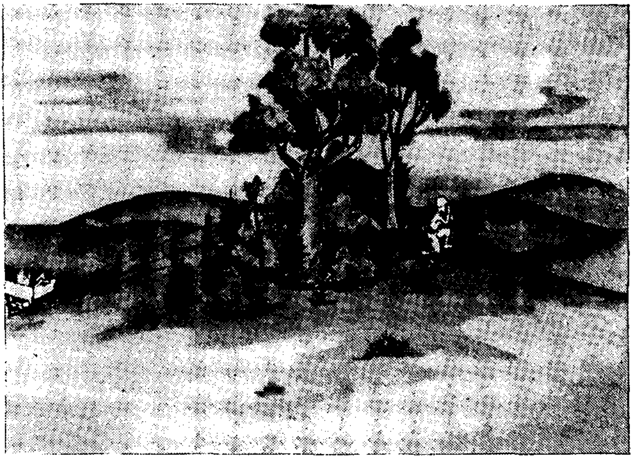


FIGURE 74.—Seek position where entire zone can be seen.



FIGURE 75.—Do not take position behind isolated prominent terrain features, for they will draw fire.



FIGURE 76.—Seek position where no prominent features are present.

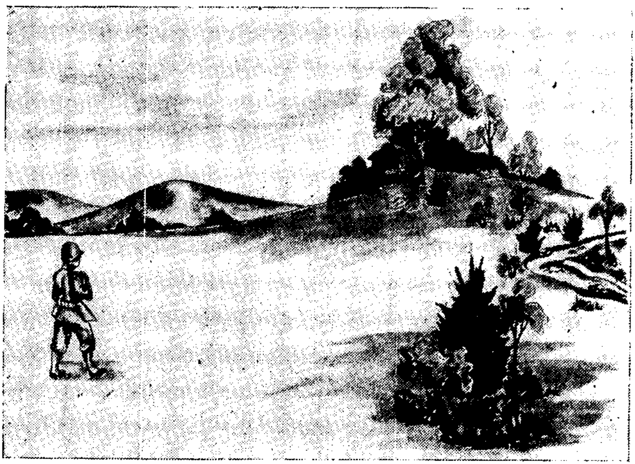


FIGURE 77.—Do not approach an observation post over exposed ground.

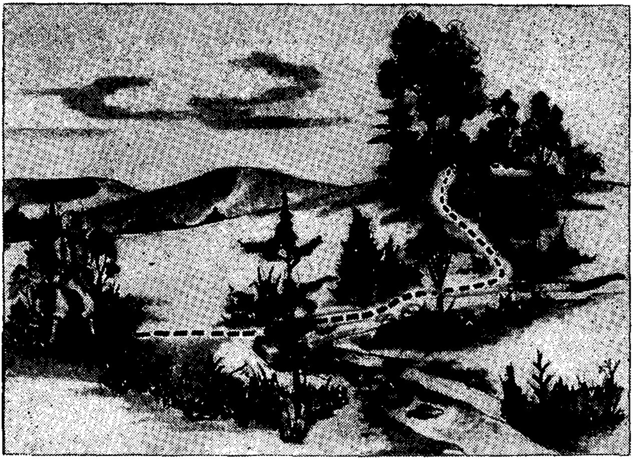


FIGURE 78.—Approach observation post under cover.

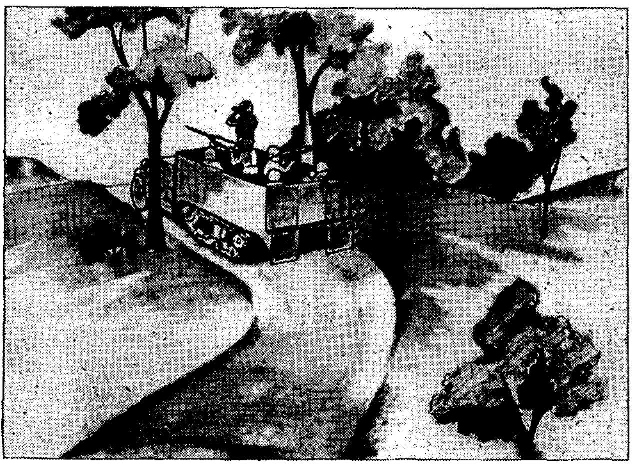


FIGURE 79.—Do not drive half-track up to the observation point.

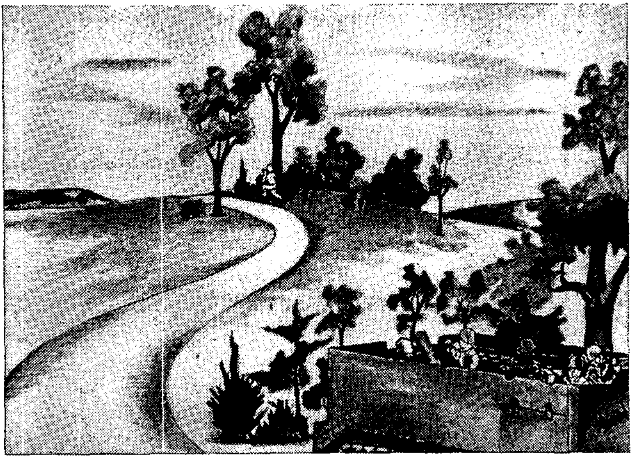


FIGURE 80.—Keep half-track down the slope under cover and have guns manned.

SECTION VI

OFFENSIVE ACTION

■ 36. GENERAL.—*a*. The mortar supports the attack by fire primarily on those targets that cannot be engaged by flat trajectory weapons, and by use of screening smoke.

b. Fire missions may be divided into three classes:

(1) *Principal*.—To destroy or screen those enemy targets which must be destroyed or screened to insure the success of the supported unit.

(2) *Secondary*.—Those enemy targets which are engaged only after the principal mission has been accomplished.

(3) *Emergency*.—Those targets which appear suddenly and which will interfere critically with the mission of the supported unit.

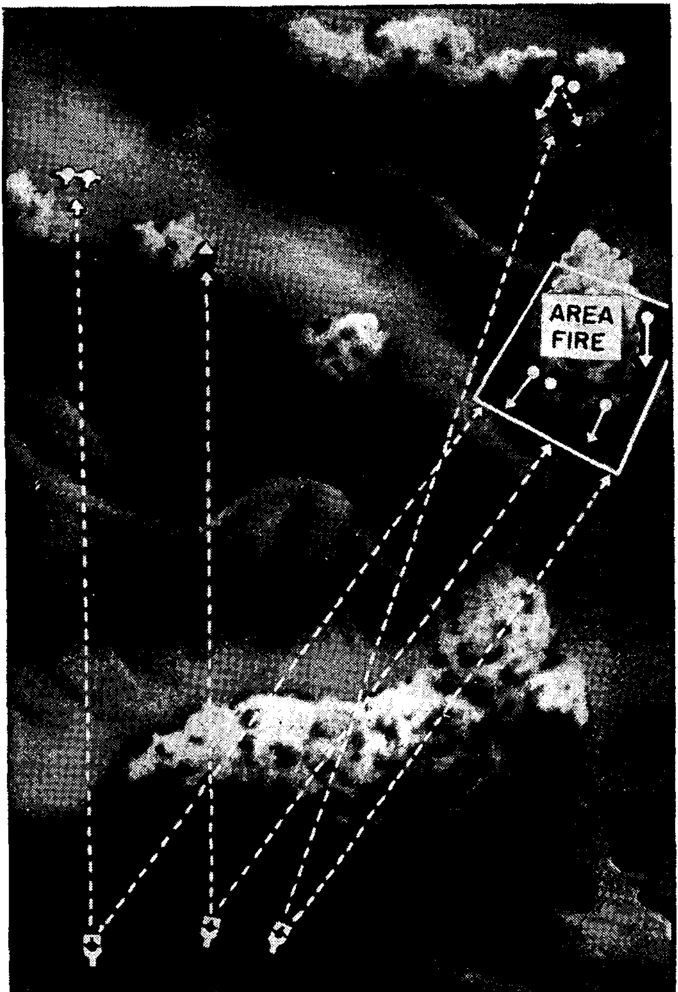


FIGURE 81.—Principal fire missions in support of infantry attack.

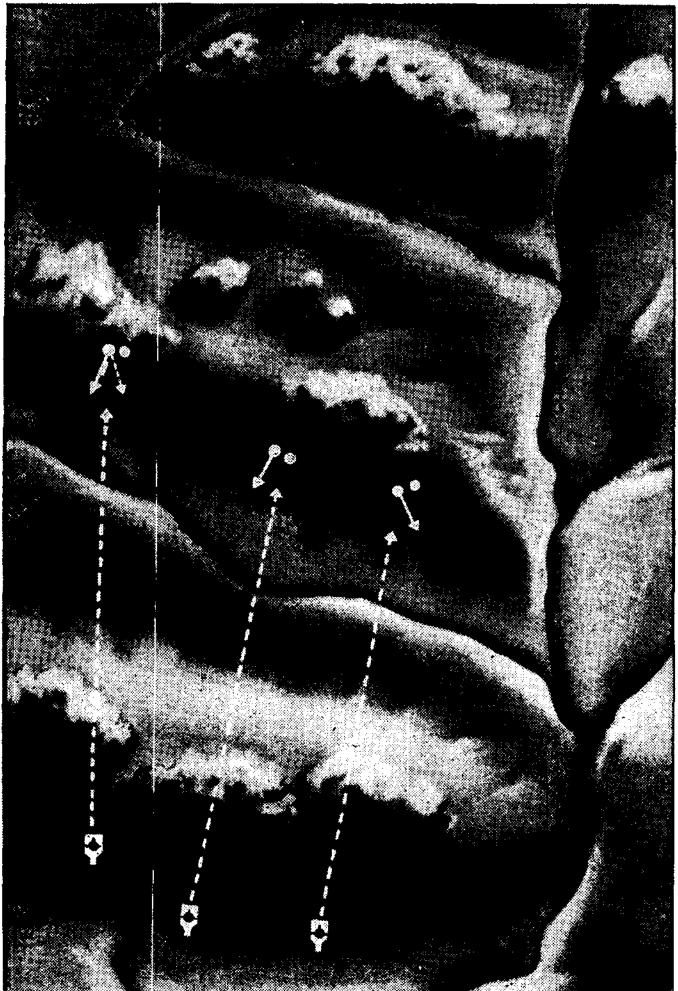


FIGURE 82.—Secondary missions in support of infantry attack.

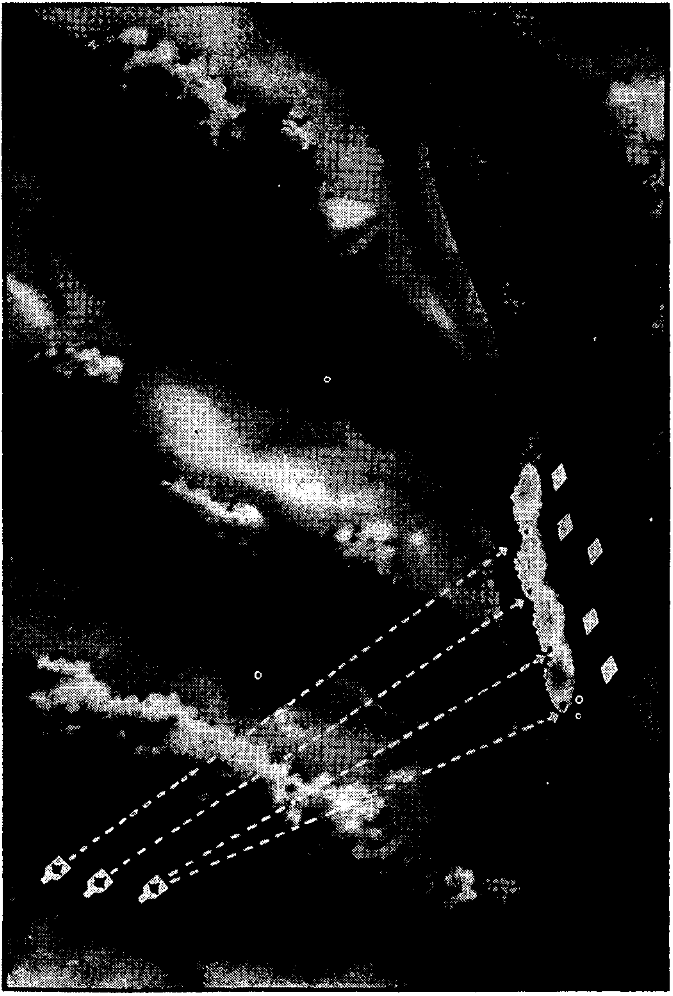


FIGURE 83.—Emergency fire mission in support of infantry or tank attack.

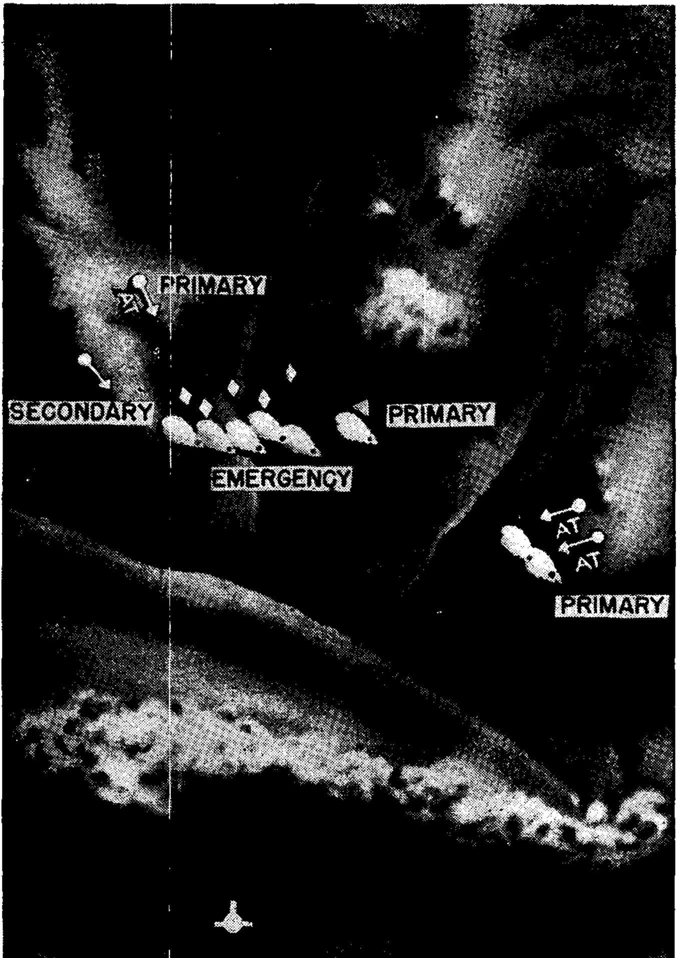


FIGURE 84.—Fire missions in support of tank attack.

■ 37. USE OF SMOKE IN SUPPORT OF OFFENSIVE OPERATIONS.—Figures 85 to 90, inclusive, show use of smoke to support offensive operations. For technique of use of smoke see section II.

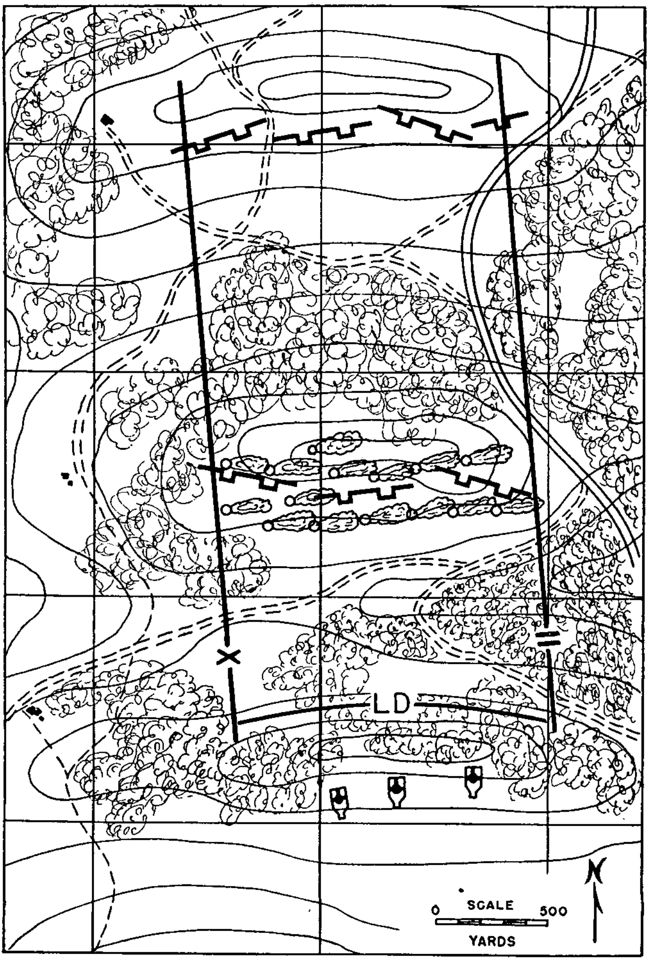


FIGURE 85.—Support of attack by smoke on hostile position. Mortar platoon can smoke 900 yards with flank wind. Smoke is placed just prior to start of attack and maintained until tanks reach position. In this case tanks should reach position 5 minutes after passing line of departure.

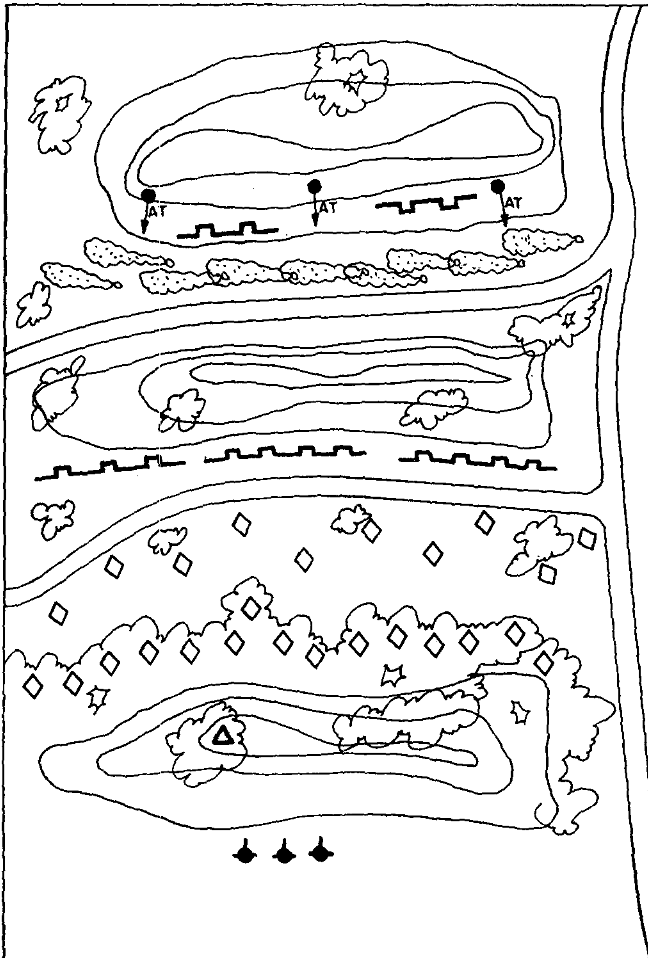


FIGURE 86.—Support of attack by placing smoke on rear positions so fire of machine guns or antitank guns in rear will be ineffective.

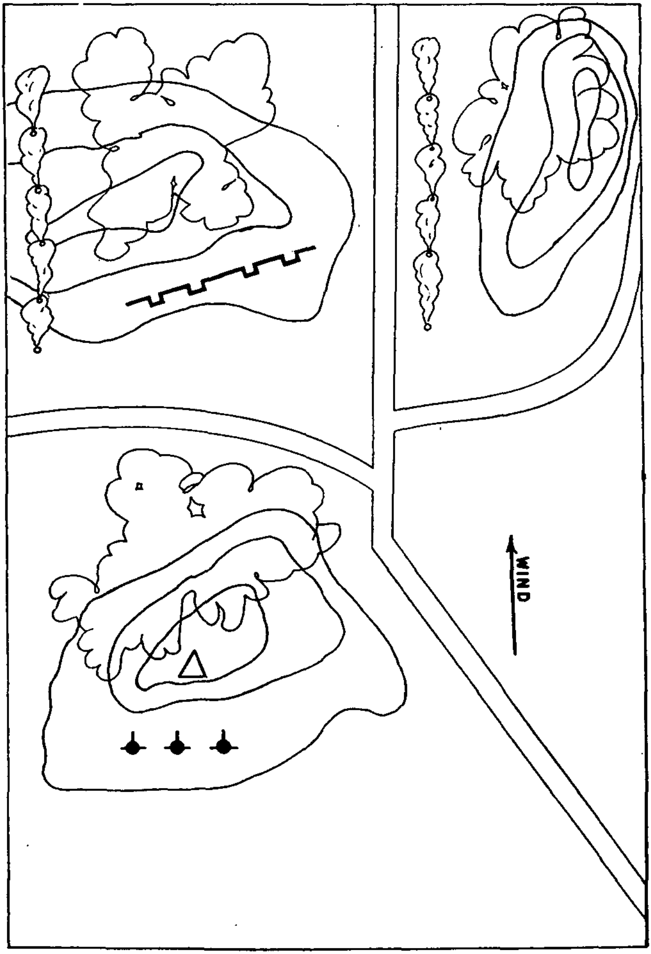


FIGURE 87.—Screening flanks of an attack.

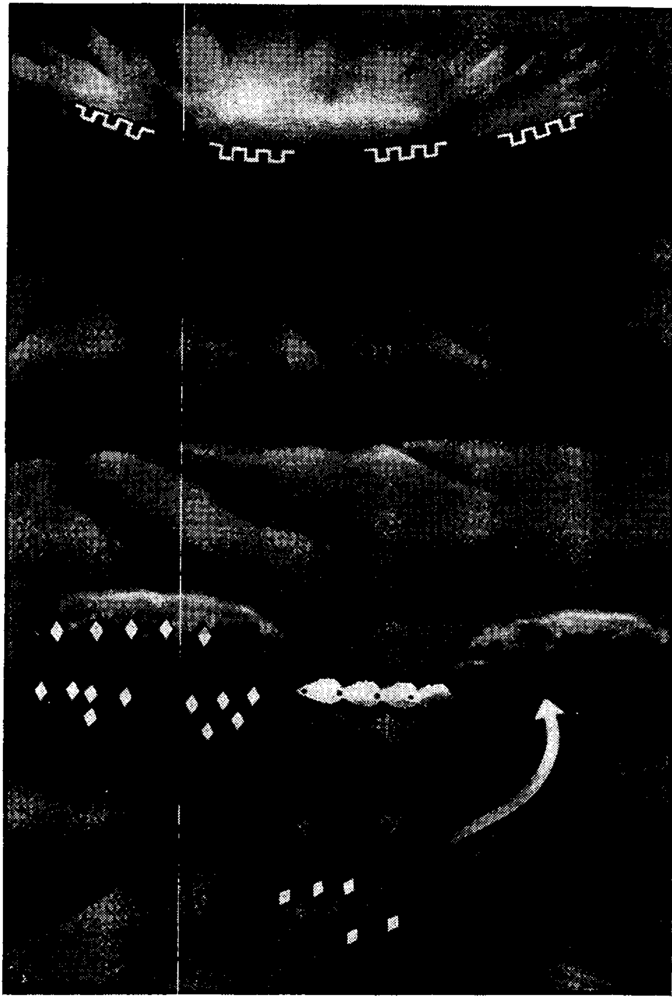


FIGURE 88.—Screening movement of troops to attack positions.

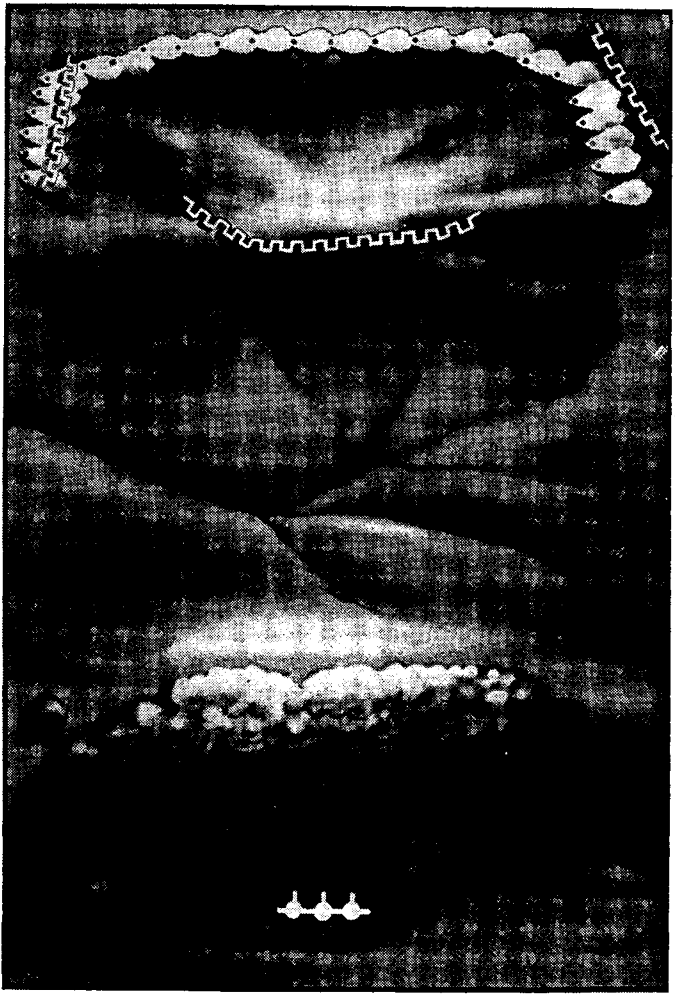


FIGURE 89.—Forming box to screen a limited objective attack.

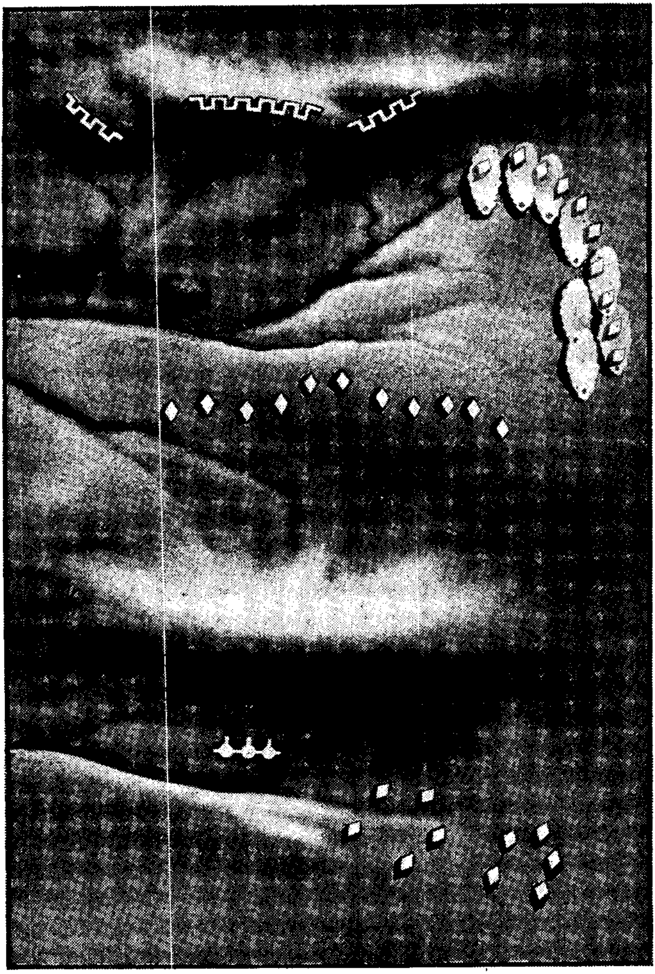


FIGURE 90.—Disorganizing enemy counterattack. Smoke placed in front of and on attacking hostile tanks will delay their movement, screen our own attacking tanks, and give battalion reserve an opportunity to move into position to destroy hostile tanks.

■ 38. COORDINATION WITH OTHER FIRES.—Mortar fires in the attack are coordinated with the fires of all other weapons in order that there will not be a duplication of firing. The fires of the mortar are coordinated by the battalion commander. (See FM 17–62.)

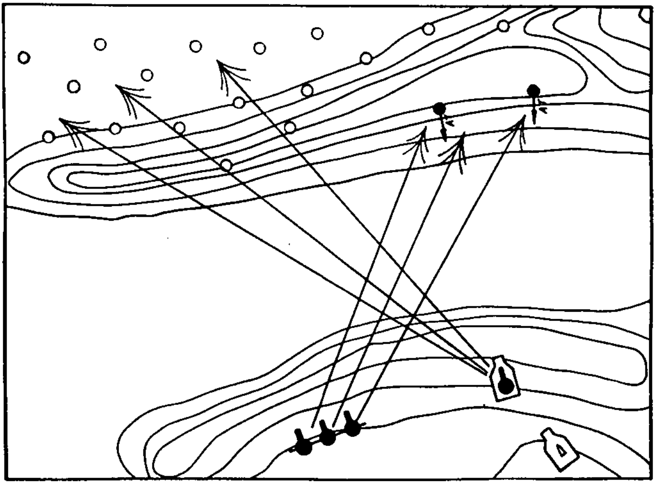


FIGURE 91.—Lack of coordination of fire causes wrong target to be taken under fire. Here mortars are shooting at enemy on forward slope, and assault gun is shooting over the slope.

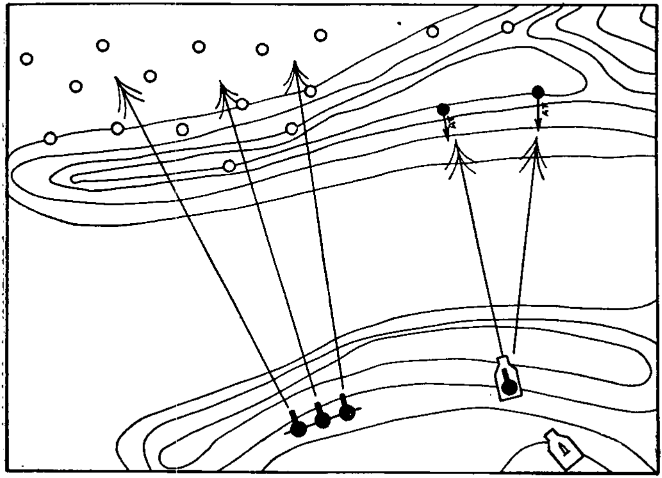


FIGURE 92.—Coordination gives effective fire. Mortars shoot at enemy behind hill. Guns shoot at enemy on forward slope.

■ 39. PURSUIT.—Pursuit of a defeated enemy is pushed to the utmost endurance of men and material. Mortars assist in pursuit by—

a. Fire on hostile troops defending road blocks.

b. Fire in conjunction with other troops to halt hostile retreats at defiles or other key positions.

c. Use of smoke to disorganize the enemy retreating forces.



FIGURE 93.—Do not use light (HE) shells to destroy a road block.



FIGURE 94.—Use light or heavy shells on weapons defending road block or place smoke on these weapons to cover maneuvering troops.

SECTION VII

DEFENSE

■ 40. GENERAL.—FM 100–5 and 17–10 cover generally the subject of defense. In defense the primary mission of the mortars is to cover by fire those areas that cannot be covered by flat trajectory weapons and are not covered by artillery. Mortar fire may be used in place of artillery fire on certain areas. All fires must be coordinated by battalion and higher unit commander.

■ 41. DEFENSIVE POSITIONS.—In defense, positions must be carefully selected. Alternate and supplementary positions together with routes thereto are reconnoitered. Because of its mobility the mortar can be easily and rapidly transferred from one position to another.

■ 42. DELAYING ACTION AND WITHDRAWAL.—In delaying action or withdrawal, as in defense, mortars are used to support by fire the defensive action of the delaying force. They may be used to place a smoke screen to cover the withdrawal of delaying troops. (See FM 100–5 and 17–10.)

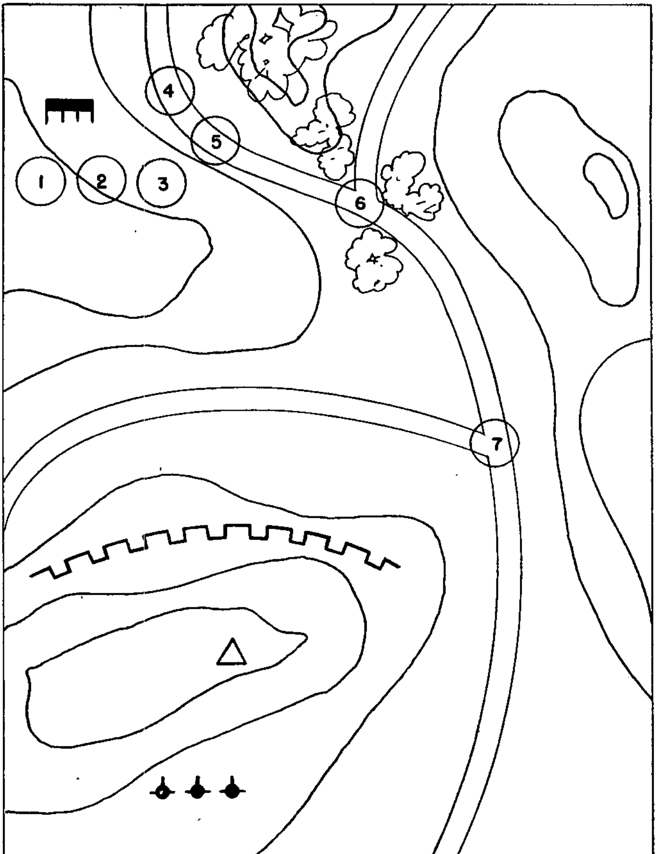


FIGURE 95.—Defensive fires for mortar platoon. Each mortar can cover an area of 100 by 100 yards by area fire. This requires great expenditure of ammunition.



FIGURE 96.—Mortars laying smoke screen to cover withdrawal of other troops.

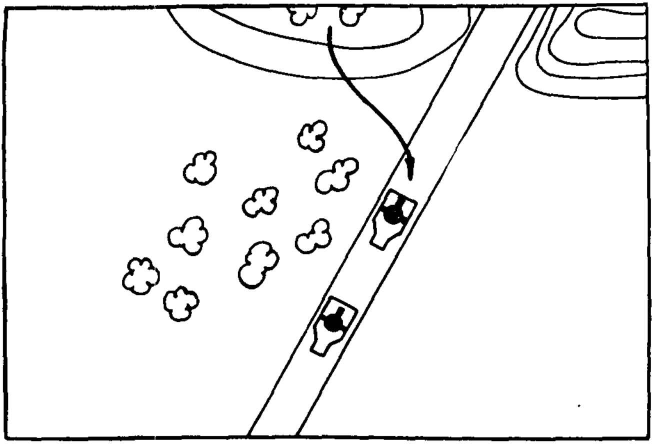


FIGURE 97.—Do not withdraw in open.

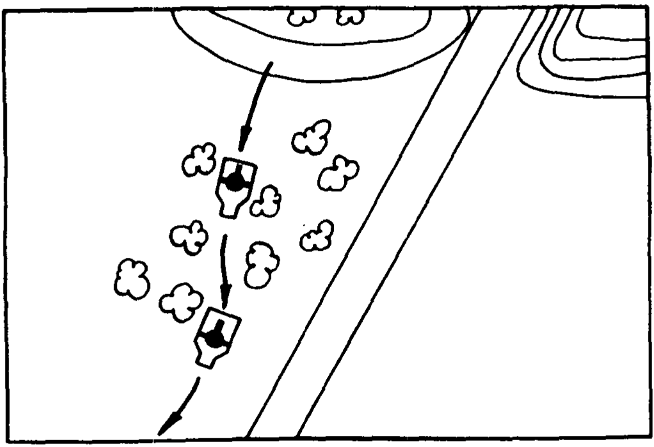


FIGURE 98.—Use concealed routes for withdrawal.

INDEX